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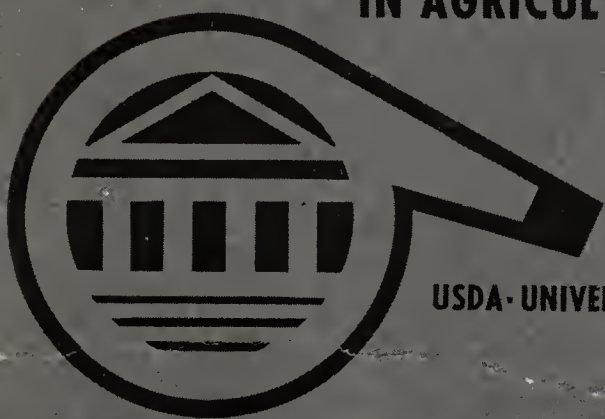
~~RESEARCH~~

HC-7

MANUAL of CLASSIFICATION of AGRICULTURAL and FORESTRY RESEARCH

REVISION II

SCIENCE AND EDUCATION
IN AGRICULTURE



USDA · UNIVERSITIES

Classifications used in
Current
Research
Information
System

by Activity, by Commodity, Resource
or Technology, by Field of Science,
and by Research Problem Area (RPA)

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MANUAL OF CLASSIFICATION

of

AGRICULTURAL AND FORESTRY RESEARCH

2021
Classifications used in the Current Research Information
System by Activity, by Commodity, Resource or Technology,
by Field of Science, and by Research Problem Area (RPA)

3001
U. A. 3003
Prepared by Research Classification Subcommittee
Agricultural Research Policy Advisory Committee

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CATALOGING - PREP.

The RESEARCH CLASSIFICATION MANUAL will be more useful if index tabs are attached. The following tabs may be attached:

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MANUAL OF
CLASSIFICATION OF AGRICULTURAL AND FORESTRY RESEARCH

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CLASSIFICATION OF AGRICULTURAL AND FORESTRY RESEARCH

INTRODUCTION

RESEARCH CLASSIFICATION

The research classification scheme described in this manual is used in the Current Research Information System (CRIS). It is intended for use in preparing CRIS form AD 417. A copy of this form along with the general instructions for completing fields 41-52 and fields 62-67 is included for your information on pages 168 to 171. For those who are encountering these classification schemes for the first time, the suggestions that follow might be helpful. CRIS Document #1(Rev.) provides more specific instructions for using this classification system to complete the AD 417. Also, many individual research organizations provide their own instruction manuals. Please note that PPBS (Program Element) codes are no longer used and have been deleted from the manual. X

RESEARCH PROBLEM AREA (RPA)

The most important type of Research Classification is the classification by Research Problem Area, RPA. The 98 RPA's are arranged in nine generally related groups. These groups parallel the first nine goals of the original long range study, "A National Program of Research for Agriculture." (See pages 45-49).

The research on RPA'S in different groups may be closely related. The RPA descriptions, the examples of areas of research included, the listing of specific research excluded, and the listings of RPA-activity-commodity relationships are intended as guidelines for selection of the appropriate RPA to use.

It will be helpful to read over the titles of the RPA's given in the index of RPA's, pages 4-7. This will reveal some of the less obvious RPA's and arrangements. For example, research on research administration is classified under RPA 114 - Research on Management of Research. It was included quite arbitrarily under Goal I.

The reading of the RPA titles serves to narrow the search for a best choice. When the search for the correct RPA has been narrowed to a small number, the definitive statements for each should be carefully read. Titles alone do not provide an adequate basis for choosing the correct RPA. It is also important to understand that the listing of areas of research given for each RPA is illustrative only. This list is not exhaustive. The fact that any specific area of research was not listed does not necessarily exclude it.

THREE DIMENSIONS FOR FURTHER DESCRIPTION

A second feature of this classification system is the three-dimensional scheme of describing the research: by Activity, by Commodity, Resource, or Technology not Commodity-Oriented, and by Field of Science.

"A" - Activity - which describes the purpose or nature of the activity. See Table A, pages 8-9 for the Activities. The nature of Activity Classification will be more apparent from reading through Table "A" than by reading a narrative description.

"B" - Commodity, Resource, or Technology Not Commodity Oriented - also provides an entry point for research classification. It is the objective of the research--e.g., what is being improved or protected. The codes and classification are given in Table "B" (pages 10-21). All commodities, resources, and technologies in Table "B" have been indexed in an alphabetical listing, pages 10 to 21.

The examples of commodities or resources which are provided are not intended to be exhaustive. They are illustrative. The fact that similar items are not listed does not exclude them. An index to the RPA's under which research is done on each Commodity, Resource, or Technology Not Commodity Oriented is given on pages 30-42.

The classification code numbers for the Primary Classification of Commodity, Resource, or Technology Not Commodity Oriented end with "00", e.g. 0100 Soil and Land. Code numbers for subclassification have a third digit other than zero. The fourth digit may be zero or another digit.

"C" - Field of Science - lists the disciplines employed in doing the research. It consists essentially of the fields of science used by the National Science Foundation for various Government-wide reports. Table "C" is given on pages 43 to 44.

INDEX TO RESEARCH PROBLEM AREAS (RPA'S)

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102	Soil, Plant, Water, Nutrient Relationships	52
103	Management of Saline and Sodic Soils and Salinity	53
104	Alternative Uses of Land	54
105	Conservation and Efficient Use of Water	55
106	Efficient Drainage and Irrigation Systems and Facilities	56
107	Watershed Protection and Management	57
108	Economic and Legal Problems in Management of Water and Watersheds ..	58
109	Adaptation to Weather and Weather Modification	59
110	Appraisal of Forest and Range Resources	60
111	Biology, Culture and Management of Forests and Timber-Related Crops.	61
112	Improvement of Range Resources	63
113	Remote Sensing	64
114	Research on Management of Research	65
GOAL II: PROTECT FORESTS, CROPS AND LIVESTOCK FROM INSECTS, DISEASES AND OTHER HAZARDS		
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202	Control of Diseases, Parasites and Nematodes Affecting Forests	68
203	Prevention and Control of Forest and Range Fires	69
204	Control of Insects, Mites, Slugs, and Snails on Fruit and Vegetable Crops	70
205	Control of Diseases and Nematodes of Fruit and Vegetable Crops	71
206	Control of Weeds and Other Hazards to Fruit and Vegetable Crops	72
207	Control of Insects, Mites, Snails, and Slugs Affecting Field Crops and Range	73
208	Control of Diseases and Nematodes of Field Crops and Range	74
209	Control of Weeds and Other Hazards of Field Crops and Range	75
210	Control of Insects and External Parasites Affecting Livestock, Poultry, and Other Animals	76
211	Control of Diseases of Livestock, Poultry and Other Animals	77
212	Control of Internal Parasites of Livestock, Poultry, and Other Animals	78
213	Protect Livestock, Poultry and Other Animals from Toxic Chemicals, Poisonous Plants, and Other Hazards	79
214	Protection of Plants, Animals, and Man from Harmful Effects of Pollution	81

RPA	Title	Page
GOAL III: PRODUCE AN ADEQUATE SUPPLY OF FARM AND FOREST PRODUCTS AT DECREASING REAL PRODUCTION COSTS		
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302	New and Improved Forest Engineering Systems	84
303	Economics of Timber Production	85
304	Improvement of Biological Efficiency of Fruit and Vegetable Crops ..	86
305	Mechanization of Fruit and Vegetable Crop Production	88
306	Production Management Systems for Fruits and Vegetables	89
307	Improvement of Biological Efficiency of Field Crops	90
308	Mechanization of Production of Field Crops	92
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317	Mechanization and Structures Used in Production of Livestock, Poultry and Other Animals.....	101
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404	Quality Maintenance in Storing and Marketing Fruits and Vegetables .	108
405	Production of Field Crops with Improved Acceptability	109
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407	New and Improved Feed, Textile, and Industrial Products from Field Crops	111
408	Quality Maintenance in Storing and Marketing Field Crops	112
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410	New and Improved Meat, Milk, Eggs, and Other Animal Food Products ..	114
411	New and Improved Non-Food Animal Products	115
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RPA	Title	Page
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503	Efficiency in Marketing Agricultural Products and Production Inputs*.	120
506	Supply, Demand and Price Analysis- Crop and Animal Products	121
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508	Development of Domestic Markets for Farm Products	123
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902	Outdoor Recreation	159
903	Multiple Use Potential of Forest Land and Evaluation of Forestry Programs.....	160
904	Fish and Other Marine Life, Fur-Bearing Animals and Other Wildlife ..	161
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TABLE "A"

CLASSIFICATION CODESHEET FOR REPORT OF AGRICULTURAL RESEARCH

(1) ACTIVITY*

Conservation, development and use of soil, water, forest and related resources

- 4100 Resource description and inventory
- 4300 Resource development, conservation and management
- 4400 Evaluation of alternative uses and methods of use

Protection of man, commodities, resources and their products from losses, damage or discomfort

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4700 Protection against weeds and their control agents
- 4810 Protection against fire
- 4820 Protection against flood
- 4830 Protection against pollutants
- 4840 Protection against climatic extremes (frost, hail, wind, drought, etc.)
- 4850 Protection against birds
- 4860 Protection against rodents and other mammals
- 4870 Protection against molds, fungi and other spoilage organisms
- 4880 Protection against allergens, toxins and poisonous plants
- 4890 Protection against radiation, noise and other hazards

Efficient production and quality improvement

- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals
- 5100 Increasing consumer acceptability of farm and forest products
- 5200 Mechanization, improvement of physical efficiency, and development of structures and facilities
- 5300 Management of labor, capital and other inputs

Product development and processing

- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes

Efficient marketing, including pricing and quality

- 5800 Identification, measurement and maintenance of quality
- 5900 Improving economic and physical efficiency in marketing including analysis of market structure and functions
- 6000 Analysis of supply, demand and price, including interregional competition

More of Table "A" continued on next page

TABLE "A" (Continued)Efficient marketing, including pricing and quality (continued)

- 6100 Developing domestic markets, including consumer preference and behavior
- 6200 Foreign trade, market development and competition

Improvement of human nutrition, shelter, and consumer satisfaction

- 6300 Nutritional values, consumption patterns, and eating quality of foods
- 6400 Quality of family living, including housing, management and use of time, money and other resources

Development of human resources and of economies of communities, areas and nations

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

General Methodology, Technology and Evaluation

- 7000 Design of experiments and methods of statistical analysis
- 7100 Improvement of research administration
- 7200 Information documentation and retrieval
- 7300 Evaluation of public programs, policies and services
- 7400 Improvement of agricultural statistics
- 7500 Development of research equipment and technology

* The code numbers in Table "A" are applicable to column (1) under "Activity" of Fields (or lines) 41-52 on Form AD-417.

INDEX FOR COMMODITIES, RESOURCES, OR TECHNOLOGY NOT ASSOCIATED WITH
SPECIFIC COMMODITIES

COMMODITY, RESOURCE OR TECHNOLOGY	PRIME CLASSIFICATION	SUB- CLASSIFICATION	PAGE
ABACA	2800	2810	27
AGAVE	2800	2810	27
AIR	0400	*	22
ALFALFA	2000	2031	26
ALMONDS	1000	1050	24
ANIMAL, VERETEBRATES	6800	*	29
ANIMALS, FUR-BEARING	0800	0860	23
ANIMALS, GAME	0800	0850	23
ANIMALS, LABORATORY	3400	3440	27
ANTELOPES	0800	0850	23
APPLES	1000	1010	24
APRICOTS	1000	1010	24
ARBORETA	1300	1391	25
AREAS AND REGIONS, INSTITUTIONS	4300	*	28
ASH	0600	0622	23
ASPARAGUS	1200	1230	24
ASPEN	0600	0623	23
AVOCADOS	0900	0920	24
AZALEA	1300	1310	25
BAMBOO SHOOTS	1200	1299	25
BANANAS	0900	0920	24
BARLEY	1800	1810	25
BASS	0800	0810	23
BASIL	1200	1291	25
BEANS (DRY)	1200	1211	24
BEANS (FRESH, FRESH-PROCESSED)	1200	1212	24
BEAVER	0800	0860	23
BEDDING PLANTS	1300	1320	25
BEEF CATTLE	3000	*	27
BEEES	3500	*	28
BEETS	1200	1259	25
BEETS, SUGAR	2700	2710	27
BENTGRASS	1300	1330	25
BERMUDAGRASS	1300	1330	25

* No sub-classifications

COMMODITY, ETC.	PRIME	SUB	PAGE
BERRIES	1000	1030	24
BEVERAGE PLANTS	2800	2830	27
BIRCH, YELLOW	0600	0622	23
BIRDS, GAME	0800	0830	23
BIRDS, NON-GAME	0800	0840	23
BISON	0800	0850	23
BLACKBERRIES	1000	1030	24
BLUEBERRIES	1000	1030	24
BLUEGILL	0800	0810	23
BLUEGRASS, FORAGE	2000	2010	26
BLUEGRASS, TURF	1300	1330	25
BOBCATS	0800	0850	23
BOTANICAL GARDENS	1300	1391	25
BOYSENBERRIES	1000	1030	24
BROCCOLI	1200	1240	24
BROMEGRASS	2000	2010	26
BRUSSELL SPROUTS	1200	1240	24
BUCKWHEAT	1800	1890	25
BULB CROPS	1300	1320	25
BUTTER	3100	3110	27
CABBAGE	1200	1240	24
CAMELLIA	1300	1310	25
CAMPGROUNDS	0500	0520	22
CANE FRUITS	1000	1030	24
CANE, SUGAR	2700	2720	27
CANTALOUPE	1200	1220	24
CARP	0800	0821	23
CARROTS	1200	1253	24
CASHEWS	1000	1050	24
CASSAVA	1200	1259	25
CASTORBEANS	2500	2510	26
CATFISH	0800	0821	23
CATS	3400	3430	27
CATTLE, BEEF	3000	*	27
CATTLE, DAIRY	3100	**	27
CAULIFLOWER	1200	1240	24
CELERY	1200	1230	24
CELL SYSTEMS, GENERAL TECHNOLOGY	6300	*	28
CEREAL CROPS USED FOR FORAGE	2000	2090	26
CHEESE	3100	3120	27

* No sub-classifications.

*~ See sub-classifications on page indicated.

COMMODITY, ETC.	PRIME	SUB	PAGE
CHEMURGIC CROPS	2800	2820	27
CHERRIES	1000	1010	24
CHERRY, BLACK	0600	0622	23
CHESTNUTS	1000	1050	24
CHICKENS, EGG TYPE	2900	2910	27
CHICKENS, MEAT TYPE	2900	2930	27
CHRISTMAS TREES	0600	0611	22
CITRUS	0900	0910	24
CLAMS	0800	0822	23
CLIMATE	0400	*	22
CLOTHING	3700	**	28
CLOVER, CRIMSON	2000	2039	26
CLOVER, LADINO	2000	2039	26
CLOVER, RED	2000	2033	26
CLOVER, SWEET	2000	2039	26
COCONUTS	0900	0920	24
COD	0800	0822	23
COFFEE	2800	2830	27
COLE CROPS	1200	1240	24
COMMUNITIES, INSTITUTIONS	4300	*	28
CONIFERS & HARDWOODS (BOTH), GENERAL	0600	0630	23
CONIFERS & HARDWOODS (BOTH), OTHERS	0600	0639	23
CONIFERS & HARDWOODS, MEDICINAL	0600	0632	23
CONIFERS, GENERAL	0600	0610	22
CONIFERS, ORNAMENTAL AND SHADE	0600	0615	22
CONIFERS, OTHER EASTERN	0600	0617	22
CONIFERS, OTHER WESTERN	0600	0613	22
COOPERATIVES, FARMER	4600	*	23
CORN (INCLUDES POPCORN) (SWEET 1280)	1400	*	25
COTTON	2100	**	26
COTTON, LONG FIBER	2100	2120	26
COTTON, UPLAND	2100	2110	26
COTTONSEED	2200	*	26
COTTONWOODS	0600	0623	23
COUNTIES, INSTITUTIONS	4300	*	28
CRAMBE	2500	2520	26
CRANBERRIES	1000	1030	24
CROPS, NEW & MISCELLANEOUS	2800	**	27
CROWNVETCH	2000	2034	26
CUCUMBERS	1200	1220	24

COMMODITY, ETC.	PRIME	SUB	PAGE
CUCURBITS, MELONS AND OTHER	1200	1220	24
CURRANTS	1000	1030	24
CUSK	0800	0822	23
DAIRY CATTLE	3100	**	27
DAIRY CATTLE, GENERAL	3100	3199	27
DALLISGRASS	2000	2010	26
DATES	0900	0920	24
DEER	0800	0850	23
DICHONDRA	1300	1330	25
FORAGE CROPS, GENERAL	2000	2099	24
DILL	1200	1291	25
DIOSCOREA	2800	2820	27
DOUGLAS FIR	0600	0612	22
DRUG CROPS	2800	2820	27
DUCKS, DOMESTIC	2900	2940	27
DUCKS, WILD	0800	0830	23
ECONOMY, AGRICULTURAL, FOREIGN	4500	*	28
ECONOMY, AGRICULTURAL, UNITED STATES	4400	*	28
EGGPLANT	1260	1263	25
EGGS	2900	2920	27
ELDERBERRIES	1000	1030	24
ELECTRICITY FACILITIES	3900	3990	28
ELK	0800	0850	23
ELMS (ORNAMENTAL AND SHADE ONLY)	0600	0624	23
ENDIVE	1200	1230	24
EQUIPMENT, GENERAL	3600	*	28
EQUIPMENT, HOUSEHOLD	3900	3910	28
EXPERIMENTAL DESIGN, GENERAL TECHNOLOGY	6400	*	28
FACILITIES	3900	**	28
FACILITIES, DISTRIBUTION	3900	3930	28
FACILITIES, ELECTRICITY	3900	3990	28
FACILITIES, MARKETING	3900	3930	28
FACILITIES, NON-FARM STORING	3900	3930	28
FACILITIES, PROCESSING	3900	3930	28
FACILITIES, RECREATION	3900	3930	28
FACILITIES, RELATED TO NON-FARM STRUCTURES	3900	3930	28
FACILITIES, RELATED TO OTHER FARM STRUCTURES	3900	3920	28
FACILITIES, TELEPHONE	3900	3990	28

COMMODITY, ETC.	PRIME	SUB	PAGE
FAMILY & ITS MEMBERS	4100	*	28
FARM, AS A BUSINESS ENTERPRISE	4200	*	28
FEEDSTUFFS	3600	*	28
FERTILIZERS	3600	*	28
FESCUE	1300	1330	25
FESCUE	2000	2010	26
FIBER PLANTS	2800	2810	27
FIGS	0900	0920	24
FILBERTS	1000	1050	24
FISH	0800	**	23
FISH, COMMERCIAL, FRESHWATER	0800	0821	23
FISH, COMMERCIAL, GENERAL	0800	0820	23
FISH, COMMERCIAL, SALTWATER	0800	0822	23
FISH FARMING, GENERAL	0800	0820	23
FISH, GAME	0800	0810	23
FISH, HABITATS	0800	0870	23
FLAVORING PLANTS	2800	2830	27
FLAXSEED	2500	2530	26
FLOUNDER	0800	0822	23
FLOWERS	1300	1320	25
FOLIAGE PLANTS	1300	1320	25
FOOD, GENERAL	3800	*	28
FOREST GREENS, DECORATIVE	0600	0633	23
FORESTS (TREES)	0600	**	22
FORAGE CROPS	2000	**	26
FORAGE CROPS, GENERAL	2000	2099	24
FORSYTHIA	1300	1310	25
FOXES	0800	0860	23
FRUITS, CANE	1000	1030	24
FRUITS, DECIDUOUS & SMALL	1000	**	24
FRUITS, DECIDUOUS TREE	1000	1010	24
FRUIT, SUBTROPICAL	0900	0920	24
FUNGI, EDIBLE	1200	1270	25
FURNISHINGS, NON-TEXTILE	3900	3910	28
FURNITURE	3900	3910	28
GARLIC	1200	1252	24
GEESE, DOMESTIC	2900	2940	27
GEESE, WILD	0800	0830	23
GINGER	1200	1291	25
GOATS	3400	3420	27

COMMODITY, ETC.	PRIME	SUB	PAGE
GOURDS	1200	1220	24
GRAINS, OTHER SMALL	1800	**	25
GRAINS, OTHER SMALL, GENERAL	1800	1899	25
GRAPEFRUIT	0900	0910	24
GRAPES, (INCLUDING GRAPE WINES)	1000	1040	24
GRASSES, ANNUAL FORAGE	2000	2020	26
GRASSES, PERENNIAL FORAGE	2000	2010	26
GREENS (VEGETABLE)	1200	1230	24
GREENSPACE, URBAN	0500	0530	22
GROUND COVERS	1300	1330	25
GROUSE	0800	0830	23
GUAVAS	0900	0920	24
GUINEA PIGS	3400	3440	27
HABITATS, FISH	0800	0870	23
HABITATS, WILDLIFE	0800	0880	23
HADDOCK	0800	0822	23
HAKE	0800	0822	23
HARDWOODS AND CONIFERS (BOTH), OTHERS	0600	0639	23
HARDWOODS, FINE OTHER	0600	0622	23
HARDWOODS, GENERAL	0600	0620	22
HARDWOODS, ORNAMENTAL & SHADE, OTHER	0600	0625	23
HARDWOODS, OTHER	0600	0629	23
HEMP	2800	2810	27
HERBS	1200	1291	25
HERRING	0800	0822	23
HIBISCUS	1300	1310	25
HOLLY	1300	1310	25
HONEY	3500	*	28
HOPS	2800	2830	27
HORSES	3400	3410	27
HOUSES (PEOPLE)	3900	3910	28
HYDRANGEA	1300	1310	25
ICE CREAM	3100	3150	27
INSECTS	6500	*	28
INSECTS, POLLINATING OTHER	3500	*	28
INVERTEBRATES, GENERAL TECHNOLOGY	6500	*	28
KALE	1200	1240	24
KENAF	2800	2810	27
KOHLRABI	1200	1240	24
KUMQUATS	0900	0910	24

COMMODITY, ETC.	PRIME	SUB	PAGE
LABORATORY ANIMALS	3400	3440	27
LAND	0100	*	22
LAUREL	1300	1310	25
LAWNS	1300	1330	25
LEEKs	1200	1252	24
LEGUMES, GENERAL	2000	2030	26
LEMONS	0900	0910	24
LENTILS	1200	1215	24
LESPÉDEZA	2000	2039	26
LESQUERELLA	2500	2590	26
LETTUCE	1200	1230	24
LILAC	1300	1310	25
LIMES	0900	0910	24
LOBSTER	0800	0822	23
MACADAMIA NUTS	1000	1050	24
MACHINERY	3600	*	28
MAGNOLIA	1300	1310	25
MANGOS	0900	0920	24
MAPLE, FOR SYRUP & SAP ONLY	0600	0626	23
MARKETING FIRMS (NOT COOPERATIVES)	4700	*	28
MARKETING SYSTEMS	4800	*	28
MARTENS	0800	0860	23
MEAT	3100	3130	27
MELONS	1200	1220	24
MENHADEN	0800	0822	23
MICE	3400	3440	27
MICROORGANISMS, VIRUSES, ETC.	6600	*	29
MILK	3100	3140	27
MILLET, OTHER SMALL GRAINS	1800	1890	25
MILLETS, FORAGE CROPS	2000	2020	26
MINKS	0800	0860	23
MINT	2800	2830	27
MOHAIR	3400	3420	27
MOOSE	0800	0850	23
MULES	3400	3410	27
MUSKELLUNGE	0800	0810	23
MUSKMELONS	1200	1220	24
MUSKRATS	0800	0860	23
MUSHROOMS	1200	1270	25
MUSTARD	1200	1291	25

COMMODITY, ETC.	PRIME	SUB	PAGE
NAVAL STORES	0600	0614	22
NECTARINES	1000	1010	24
NUTRIA	0800	0860	23
NUTS, EDIBLE TREE	1000	1050	24
OAKS, SELECT RED & WHITE	0600	0622	23
OATS	1800	1820	25
OILSEED & OIL CROPS, OTHER	2500	**	26
OKRA	1200	1299	25
OLIVES	0900	0920	24
ONIONS	1200	1252	24
ORANGES	0900	0910	24
ORANGES, MANDARIN	0900	0910	24
ORCHARDGRASS	2000	2010	26
ORNAMENTALS	1300	**	25
ORNAMENTALS, HERBACEOUS	1300	1320	25
ORNAMENTALS, WOODY	1300	1310	25
OYSTERS	0800	0822	23
PAPAYAS	0900	0920	24
PARKS	0500	0530	22
PARSLEY	1200	1230	24
PARTRIDGES	0800	0830	23
PASSION FRUITS	0900	0920	24
PASTURE	1900	*	26
PEACHES	1000	1010	24
PECANS	1000	1050	24
PEANUTS	2400	*	26
PEARS	1000	1010	24
PEAS (DRY)	1200	1213	24
PEAS (FRESH, FRESH-PROCESSED)	1200	1214	24
PEOPLE, AS CONSUMERS	4000	*	28
PEOPLE, AS INDIVIDUAL WORKERS	4000	*	28
PEOPLE, AS MEMBERS OF SOCIETY	4000	*	28
PEPPERS	1200	1262	25
PESTICIDES, GENERAL PURPOSE SUPPLIES	3600	*	28
PETS	3400	3430	27
PHEASANTS	0800	0830	23
PICNIC AREAS	0500	0520	22

COMMODITY, ETC.	PRIME	SUB	PAGE
PIKE	0800	0810	23
PINEAPPLES	0900	0920	24
PINE, SOUTHERN	0600	0616	22
PLANTS, GENERAL TECHNOLOGY	6700	*	29
PLUMS (INCLUDING PRUNES)	1000	1010	24
PONIES	3400	3410	27
POPLARS	0600	0623	23
POTATOES (IRISH)	1100	*	24
POULTRY	2900	**	27
POULTRY, GENERAL	2900	2999	27
PRIVET	1300	1310	25
PROCESSING FIRMS (NOT COOPERATIVES)	4700	*	28
PRUNES	1000	1010	24
PUMPKINS	1200	1220	24
QUAIL	0800	0830	23
RABBITS, FUR-BEARING	0800	0860	23
RABBITS, LABORATORY	3400	3440	27
RADISHES	1200	1259	25
RAMIE	2800	2810	27
RANGE	0700	*	23
RAPE	2500	2590	26
RASPBERRIES	1000	1030	24
RATS	3400	3440	27
RECREATIONAL RESOURCES	0500	**	22
RESEARCH ON MANAGEMENT RESEARCH	6900	*	29
RESEARCH EQUIPMENT	7000	*	29
RESEARCH TECHNOLOGY	7000	*	29
RHODODENDRON	1300	1310	25
RHUBARB	1200	1230	24
RICE	1600	*	25
RIVERBASINS	0300	0310	22
ROSELLE	2800	2810	27
RYE	1800	1830	25
RYEGRASS, TURF	1300	1330	25
RYEGRASS, ANNUAL FORAGE	2000	2020	26
RYEGRASS, PERENNIAL FORAGE	2000	2010	26
SAFFLOWER	2500	2540	26
SANSEVIERIA	2800	2810	27
SAPONARIA	2800	2820	27
SEED RESEARCH, GENERAL TECHNOLOGY	6200	*	28
SENNA	2800	2820	27

COMMODITY, ETC.	PRIME	SUB	PAGE
SESAME	2500	2590	26
SEWAGE DISPOSAL	3900	3960	28
SEWAGE FACILITIES	3900	3960	28
SEWAGE SYSTEMS	3900	3960	28
SHAD	0800	0810	23
SHALLOTS	1200	1252	24
SHEEP	3300	*	27
SHELLFISH	0800	**	23
SHELLFISH, COMMERCIAL, GENERAL	0800	0820	23
SHELTERBELTS	0600	0631	23
SHRIMP	0800	0822	23
SHRUBS, WOODY	1300	1310	25
SOIL	0100	*	22
SORGHUM, GRAIN	1500	*	25
SORGHUM, SUGAR	2700	2730	27
SORGHUMS, FORAGE	2000	2020	26
SORGHUM-SUDANGRASS HYBRIDS	2000	2020	26
SOURSOPS	0900	0920	24
SOYBEANS	2300	*	26
SPICES	1200	1291	25
SPINACH	1200	1230	24
SPIRAEA	1300	1310	25
SQUASH	1200	1220	24
STATES, INSTITUTIONS	4300	*	28
STATISTICAL METHODS, GENERAL TECHNOLOGY	6400	*	28
STRAWBERRIES	1000	1030	24
STRUCTURES	3900	**	28
STRUCTURES, FARM, OTHER	3900	3920	28
STRUCTURES, NON-FARM	3900	3930	28
SUDANGRASS	2000	2020	26
SUGAR BEETS	2700	2710	27
SUGAR CANE	2700	2720	27
SUGAR CROPS	2700	*	27
SUGAR SORGHUM	2700	2730	27
SUNFLOWER	2500	2550	26
SUPPLIES, GENERAL PURPOSE	3600	*	28
SUPPLY FIRMS (NOT COOPERATIVES)	4700	*	28
SWEETCORN (SEE ALSO CORN)	1200	1280	25
SWEET POTATOES	1200	1251	24
SWINE	3200	*	27

COMMODITY, ETC.	PRIME	SUB	PAGE
TEA	2800	2830	27
TELEPHONE FACILITIES	3900	3990	28
TEPHROSIA	2800	2820	27
TEXTILES	3700	*	28
TIMOTHY	2000	2010	26
TOBACCO	2600	**	26
TOBACCO, BURLEY	2600	2620	26
TOBACCO, CIGAR TYPES	2600	2630	26
TOBACCO, FLUE-CURED	2600	2610	26
TOMATOES	1200	1261	25
TOMATOES & RELATED CROPS, GENERAL	1200	1260	25
TREES, FORESTS & FOREST PRODUCTS	0600	**	22
TREFOIL	2000	2032	26
TRITICALE	1800	1890	25
TROUT	0800	0810	23
TUNG	2500	2560	26
TURF	1300	1330	25
TURKEYS, DOMESTIC	2900	2950	27
TURKEYS, WILD	0800	0830	23
TURNIP-GREENS	1200	1230	24
TURNIPS	1200	1259	25
URBAN GREENSPACE	0500	0530	22
VANILLA	2800	2830	27
VEGETABLE, LEGUMINOUS, OTHER	1200	1219	24
VEGETABLES	1200	**	24
VEGETABLES, BULBS, GENERAL	1200	1250	24
VEGETABLES, GENERAL	1200	1298	25
VEGETABLES, LEAFY & GREENS	1200	1230	24
VEGETABLES, LEGUMINOUS, GENERAL	1200	1210	24
VEGETABLES, RHIZOMES, GENERAL	1200	1250	24
VEGETABLES, ROOT CROPS, GENERAL	1200	1250	24
VEGETABLES, TUBERS, GENERAL	1200	1250	24
VIRUSES, ETC. GENERAL TECHNOLOGY	6600	*	29
WALNUT, BLACK	0600	0621	23
WALNUTS	1000	1050	24
WATER	0200	*	22
WATER SUPPLY FACILITIES & SYSTEMS, COMMUNITY & DOMESTIC	3900	3940	28
WATER SUPPLY SYSTEMS, COM. & DOM.	3900	3940	28

COMMODITY, ETC.	PRIME	SUB	PAGE
WATERMELONS	1200	1220	24
WATERSHEDS	0300	0320	22
WEEDS, GENERAL TECHNOLOGY	6100	*	28
WHEAT	1700	**	25
WHEAT, CLUB	1700	1740	25
WHEAT, DURUM	1700	1750	25
WHEAT, GENERAL	1700	1799	25
WHEAT, HARD RED SPRING	1700	1720	25
WHEAT, HARD RED WINTER	1700	1710	25
WHEAT, SOFT RED WINTER	1700	1730	25
WHEAT, WESTERN & SOFT WHITE	1700	1740	25
WHEAT, WHITE	1700	1740	25
WHEATGRASS	2000	2010	26
WHITING	0800	0822	23
WILDERNESS (ROADLESS AREAS)	0500	0510	22
WILDLIFE HABITATS	0800	0880	23
WILDLIFE, OTHER	0800	0890	23
WINDBREAKS	0600	0631	23
WINE, GRAPE	1000	1040	24
WOOL	3300	*	27
YAMS	1200	1251	24
ZOYSIA	1300	1330	25

TABLE "B"

CLASSIFICATION CODESHEET FOR REPORT OF AGRICULTURAL RESEARCH

(3) COMMODITY, RESOURCE OR TECHNOLOGY NOT
ASSOCIATED WITH SPECIFIC COMMODITIESCOMMODITIES, AND THEIR PRODUCTS AND NATURAL RESOURCESPRIME * SUB- **
CLASSIF. CLASSIF.

0100 Soil and land

0200 Water

0300 Watersheds and river basins

0310 River basins

0320 Watersheds

0400 Air and climate

0500 Recreational Resources

0510 Wilderness (roadless areas)

0520 Campgrounds and picnic areas

0530 Parks and urban greenspace

0590 Other recreational resources

0600 Trees, forests, and forest products (excluding edible tree nut
crops (see 1050), and tung (see 2560))

0610 Conifers, general

0611 Christmas trees

0612 Douglas fir

0613 Other western conifers

0614 Naval stores

0615 Ornamental and shade conifers

0616 Southern pine

0617 Other eastern conifers

0619 Other conifers

0620 Hardwoods, general

*Primary Classification.

**Sub-Classification.

More of Table "B" continued on next page

TABLE "B" (Continued)PRIME SUB

- 0621 Black walnut
- 0622 Other fine hardwoods (ash, black cherry, yellow birch, select white and red oaks)
- 0623 Poplars, aspen and cottonwoods
- 0624 Elms (for ornamental and shade only)
- 0625 Other ornamental and shade hardwoods

- 0626 Maple for syrup and sugar only
- 0629 Other hardwoods
- 0630 Both conifers and hardwoods, general
- 0631 Shelterbelts and windbreaks
- 0632 Medicinal (see 2820 for agricultural crops)

- 0633 Decorative forest greens
- 0639 Other conifers and hardwoods

- 0700 Range
- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats

- 0810 Game fish
 - Includes: Bass, bluegill, muskellunge, pike, shad, trout
- 0820 Commercial fish and shellfish (includes fish farming), general
- 0821 Freshwater
 - Includes: Catfish, carp
- 0822 Saltwater
 - Includes: Clams, cod, cusk, flounder, haddock, hake, herring, lobster, menhaden, oysters, shrimp, whiting
- 0830 Game birds
 - Includes: Wild ducks, wild geese, grouse, partridges, pheasants, quail, wild turkeys

- 0840 Non-game birds
- 0850 Game animals
 - Includes: Antelopes, bison, bobcats, deer, elk, moose
- 0860 Fur-bearing animals
 - Includes: Beavers, foxes, martens, minks, muskrats, nutria, rabbits
- 0870 Fish habitats
- 0880 Wildlife habitats
- 0890 Other wildlife

- 0900 Citrus and subtropical fruit

More of Table "B" continued on next page

TABLE "B" (Continued)

PRIME SUB

- 0910 Citrus
 - Includes: Grapefruit, kumquats, lemons, limes, mandarin oranges, oranges
- 0920 Subtropical fruits
 - Includes: Avocados, bananas, coconuts, dates, figs, guavas, mangos, olives, papayas, passion fruits, pineapples, soursops
- 1000 Deciduous and small fruits and edible tree nuts
 - 1010 Deciduous tree fruits
 - Includes: Apples, apricots, cherries, nectarines, peaches, pears, plums (including prunes)
 - 1030 Berries and cane fruits
 - Includes: Blackberries, blueberries, boysenberries, cranberries, currants, elderberries, raspberries, strawberries
 - 1040 Grapes (including grape wines)
 - 1050 Edible tree nuts
 - Includes: Almonds, chestnuts, walnuts, cashews, filberts, macadamia nuts, pecans
 - 1090 Other (deciduous and small fruits)
 - 1099 Deciduous and small fruits, general
- 1100 potatoes
- 1200 Vegetables
 - 1210 Leguminous vegetables, general
 - 1211 Beans (dry)
 - 1212 Beans (fresh, fresh-processed)
 - 1213 Peas (dry)
 - 1214 Peas (fresh, fresh-processed)
 - 1215 Lentils
 - 1219 Other leguminous vegetables
 - 1220 Melons and other cucurbits
 - Includes: Cantaloupes, muskmelons, pumpkins, squash, watermelons, cucumbers, gourds
 - 1230 Greens and leafy vegetables
 - Includes: Endive, lettuce, spinach, turnip-greens, celery, rhubarb, parsley, asparagus
 - 1240 Cabbage and other cole crops
 - Includes: Cabbage, kale, broccoli, brussel sprouts, cauliflower, kohlrabi
 - 1250 Rhizomes, tubers, bulbs, and root crops, general (for potatoes see 1100)
 - 1251 Sweet potatoes and yams
 - 1252 Onions, garlic, leeks, shallots
 - 1253 Carrots

More of Table "B" continued on next page

TABLE "B" (Continued)

PRIME SUB

- 1259 Other (rhizomes, tubers, bulbs, and root crops) vegetables
Includes: Beets, radishes, turnips, cassava
- 1260 Tomatoes and related crops, general
- 1261 Tomatoes
- 1262 Peppers
- 1263 Eggplant
- 1264 Other (tomatoes and related crops) vegetables
- 1270 Mushrooms and other edible fungi
- 1280 Sweetcorn
- 1291 Herbs and spices
Includes: Dill, mustard, basil, ginger
- 1298 Vegetables, general
- 1299 Other (Miscellaneous vegetables)
Includes: Okra, bamboo shoots
- 1300 Ornamentals and turf
- 1310 Woody shrubs and ornamentals
Includes: Azalea, camellia, forsythia, hibiscus, holly, hydrangea, laurel, lilac, magnolia, privet, rhododendron, spiraea
- 1320 Herbaceous ornamentals
Includes: Flowers, foliage plants, bulb crops, bedding plants
- 1330 Lawns and turf
Includes: Bentgrass, bermudagrass, bluegrass, dichondra, fescue, ryegrass, zoysia, ground covers
- 1391 Arboreta and botanical gardens
- 1399 Other ornamentals (includes cacti)
- 1400 Corn (includes Popcorn). (For Sweetcorn, see 1280)
- 1500 Grain sorghum
- 1600 Rice
- 1700 Wheat
- 1710 Hard red winter wheat
- 1720 Hard red spring wheat
- 1730 Soft red winter wheat
- 1740 White wheat (Includes club, western and soft white)
- 1750 Durum wheat
- 1790 Other wheat
- 1799 Wheat, general
- 1800 Other small grains
- 1810 Barley
- 1820 Oats
- 1830 Rye
- 1890 Other small grains
Includes: Buckwheat, millet, triticale
- 1899 Other small grains General
More of Table "B" continued on next page

TABLE "B" (Continued)

PRIME SUB

1900 Pasture

2000 Forage crops

2010 Perennial grasses

Includes: Bluegrass, brome grass, dalliagrass, fescue, orchardgrass, perennial ryegrass, timothy, wheatgrass

2020 Annual grasses

Includes: Annual ryegrass, millets, forage sorghums, sudan-grass, sorghum-sudangrass hybrids

2030 Legumes, general

2031 Alfalfa

2032 Trefoil

2033 Red Clover

2034 Crownvetch

2039 Other legumes

Includes: Crimson clover, ladino clover, sweet clover, lespedeza

2090 Other forage crops

Includes: Cereal crops used for forage

2099 Forage crops, general

2100 Cotton (including cottonseed for planting purposes)

2110 Upland (G. hirsutum)2120 Long fiber (G. barbadense)

2190 Other cotton

2200 Cottonseed (for meal, oil, etc.)

2300 Soybeans

2400 Peanuts

2500 Other oilseed and oil crops (excluding cottonseed)

2510 Castorbeans

2520 Crambe

2530 Flaxseed

2540 Safflower

2550 Sunflower

2560 Tung

2590 Other oilseed and oil crops

Includes: Sesame, rape, lesquerella, etc.

2600 Tobacco

2610 Flue-cured

2620 Burley

2630 Cigar types

2690 Other Tobacco

More of Table "B" continued on next page

TABLE "B" (Continued)PRIME SUB

2700 Sugar crops

- 2710 Sugar beets
- 2720 Sugar cane
- 2730 Sugar sorghum
- 2790 Other sugar crops

2800 Miscellaneous and new crops

- 2810 Fiber plants
 - Includes: Abaca, agave, hemp, ramie, roselle, kenaf, sansevieria
- 2820 Drug and chemurgic crops
 - Includes: Dioscorea, saponaria, senna, tephrosia
- 2830 Flavoring and beverage plants
 - Includes: Coffee, hops, mint, tea, vanilla
- 2890 Other miscellaneous and new crops

2900 Poultry

- 2910 Egg type chickens
- 2920 Eggs
- 2930 Meat type chickens
- 2940 Ducks and geese
- 2950 Turkeys
- 2990 Other poultry
- 2999 Poultry, general

3000 Beef Cattle

3100 Dairy Cattle

- 3110 Butter
- 3120 Cheese
- 3130 Meat
- 3140 Milk
- 3150 Ice cream
- 3190 Other dairy cattle products
- 3199 Dairy cattle, general

3200 Swine

3300 Sheep and wool

3400 Other animals (see 0850 for fur-bearing animals)

- 3410 Horses, ponies and mules
- 3420 Goats and mohair
- 3430 Pets
 - Includes: dogs, cats
- 3440 Laboratory animals
 - Includes: Guinea pigs, mice, rats, rabbits
- 3490 Other animals

More of Table "B" continued on next page

TABLE "B" (Continued)PRIME SUB

3500 Bees and honey and other pollinating insects

MANMADE RESOURCES

3600 General purpose supplies

Includes: Machinery, equipment, fertilizers, feedstuffs,
and pesticides

3700 Clothing and textiles

3800 Food (not readily associated with specific plant and animal products)

3900 Structures and facilities

3910 Houses (people), furniture, household equipment and non-
textile furnishings

3920 Other farm structures and related facilities

3930 Non-farm structures and related facilities including those used
in the marketing, storing, processing and distributing
functions, and for recreation uses

3940 Domestic and community water supply facilities and systems

3950 Drainage and irrigation facilities and systems

3960 Sewage and waste disposal facilities and systems

3990 Other (such as trails, roads, telephone, and electricity)

HUMAN RESOURCES, ORGANIZATIONS AND INSTITUTIONS

4000 People as individual workers, consumers and members of society

4100 The family and its members

4200 The farm as a business enterprise

4300 Communities, areas and regions, including counties and States and
their institutions and organizations

4400 Agricultural economy of United States and sectors thereof, including
interrelationships with the total economy

4500 Agricultural economy of foreign countries and sectors thereof, in-
cluding interrelationships with the total economy

4600 Farmer Cooperatives

4700 Marketing, processing and supply firms other than cooperatives

4800 Marketing systems and sectors thereof

TECHNOLOGY NOT ASSOCIATED WITH SPECIFIC COMMODITIES OR RESOURCES

6100 Weeds

6200 Seed research

6300 Biological cell systems

6400 Experimental design and Statistical methods

6500 Invertebrates (including insects, mites, ticks, snails, slugs,
and leeches)

More of Table "B" continued on next page

TABLE "B" (Continued)PRIME SUB

6600	Microorganisms, viruses, etc.
6700	Plants
6800	Animals (Vertebrates)
6900	Research on research management (not research management <u>per se</u>)
7000	Research equipment and technology (such as remote sensing)

Table showing the RPA's under which research is conducted
for each Prime Classification: Commodity, Resource and Technology

Commodity Code	
0100	Soil & Land
RPA 101	Appraisal of Soil Resources
RPA 102	Soil, Plant, Water, Nutrient Relationships
RPA 103	Management of Saline & Sodic Soils & Salinity
RPA 104	Alternative Uses of Land
RPA 106	Efficient Drainage & Irrigation Systems & Facilities
RPA 107	Watershed Protection & Management
RPA 603	Technical Assistance to Developing Countries
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
0200	Water
RPA 103	Management of Saline & Sodic Soils & Salinity
RPA 104	Alternative Uses of Land
RPA 105	Conservation & Efficient Use of Water
RPA 106	Efficient Drainage & Irrigation Systems & Facilities
RPA 107	Watershed Protection & Management
RPA 108	Economic & Legal Problems in Management of Water & Watersheds
RPA 603	Technical Assistance to Developing Countries
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
0300	Watersheds & River Basins
RPA 107	Watershed Protection & Management
RPA 108	Economic & Legal Problems in Management of Water & Watersheds
RPA 302	New & Improved Forest Engineering Systems
RPA 603	Technical Assistance to Developing Countries
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
RPA 903	Multiple Use Potential of Forest land & Evaluation of Forestry Programs
0400	Air & Climate
RPA 109	Adaptation to Weather & Weather Modification
RPA 603	Technical Assistance to Developing Countries
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

0500 Recreational Resources

- RPA 214 Protection of Plants, Animals, & Man from Harmful Effects
 of Pollution
- RPA 603 Technical Assistance to Developing Countries
- RPA 902 Outdoor Recreation
- RPA 903 Multiple Use Potential of Forest Land & Evaluation of
 Forestry Programs

0600 Trees, forests, & forest products (excluding edible tree
 nut crops, (see 1015) and tung (see 2560))

- RPA 107 Watershed Protection & Management
- RPA 110 Appraisal of Forest & Range Resources
- RPA 111 Biology, Culture & Management of Forests & Timber-Related
 Crops
- RPA 113 Remote Sensing
- RPA 201 Control of Insects Affecting Forests
- RPA 202 Control of Diseases, Parasites & Nematodes Affecting Forests
- RPA 203 Prevention & Control of Forest & Range Fires
- RPA 214 Protection of Plants, Animals, & Man from Harmful Effects
 of Pollution
- RPA 301 Genetics & Breeding of Forest Trees
- RPA 302 New & Improved Forest Engineering Systems
- RPA 303 Economics of Timber Production
- RPA 401 New & Improved Forest Products
- RPA 502 Development of Markets & Efficient Marketing of Timber &
 Related Products
- RPA 512 Improvement of Grades & Standards - Forest Products
- RPA 513 Supply, Demand & Price Analysis - Forest Products
- RPA 601 Foreign Market Development
- RPA 603 Technical Assistance to Developing Countries
- RPA 604 Product Development & Marketing for Foreign Markets
- RPA 801 Housing
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water & Air Pollution & Disposal
 of Wastes
- RPA 903 Multiple Use Potential of Forest Land & Evaluation of
 Forestry Programs
- RPA 905 Trees to Enhance Rural & Urban Environment

0700 Range

- RPA 107 Watershed Protection & Management
- RPA 110 Appraisal of Forest & Range Resources
- RPA 112 Improvement of Range Resources
- RPA 203 Prevention & Control of Forest & Range Fires
- RPA 207 Control of Insects, Mites, Snails & Slugs Affecting Field Crops
 & Range

0700	Range (Continued)
RPA 208	Control of Diseases & Nematodes of Field Crops & Range
RPA 209	Control of Weeds & Other Hazards of Field Crops & Range
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 603	Technical Assistance to Developing Countries
RPA 808	Government Programs to Balance Farm Output & Market Demand
RPA 903	Multiple Use Potential of Forest land & Evaluation of Forestry Programs
0800	Fish, shellfish, game and fur-bearing animals & other wildlife & their habitats
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 410	New & Improved Meat, Milk, Eggs, & Other Animal Food Products
RPA 411	New & Improved Non-Food Animal Products
RPA 412	Quality Maintenance in Marketing Animal Products
RPA 501	Improvement of Grades & Standards - Crop & Animal Products
RPA 506	Supply, Demand, & Price Analysis - Crop & Animal Products
RPA 508	Development of Domestic Markets for Farm Products
RPA 601	Foreign Market Development
RPA 603	Technical Assistance to Developing Countries
RPA 604	Product Development & Marketing for Foreign Markets
RPA 702	Protect Food & Feed Supplies From Harmful Microorganisms & Naturally Occurring Toxins
RPA 703	Food Choices, Habits, & Consumption
RPA 704	Home & Commercial Food Service
RPA 708	Human Nutrition
RPA 808	Government Programs to Balance Farm Output & Market Demand
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
RPA 903	Multiple Use Potential of Forest Land & Evaluation of Forestry Program
RPA 904	Fish & Other Marine Life, Fur-bearing Animals & Other Wildlife
0900	Citrus & subtropical fruit
1000	Deciduous & small fruits & edible tree nuts
1100	Potatoes
1200	Vegetables
RPA 204	Control of Insects, Mites, Slugs & Snails on Fruit & Vegetable Crops
RPA 205	Control of Diseases & Nematodes of Fruit & Vegetable Crops
RPA 206	Control of Weeds & Other Hazards to Fruit & Vegetable Crops
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 304	Improvement of Biological Efficiency of Fruit & Vegetable Crops
RPA 305	Mechanization of Fruit & Vegetable Crop Production
RPA 306	Production Management Systems for Fruits & Vegetables
RPA 402	Production of Fruit & Vegetable Crops with Improved Acceptability
RPA 403	New & Improved Fruit & Vegetable Products & By-products

0900, 1000, 1100, 1200 (Continued) - Same RPA's applicable

RPA 404	Quality Maintenance in Storing & Marketing Fruits & Vegetables
RPA 501	Improvement of Grades & Standards - Crop & Animal Products
RPA 503	Efficiency in Marketing Agricultural Products & Production Inputs
RPA 506	Supply, Demand, & Price Analysis - Crop & Animal Products
RPA 507	Competitive Interrelationships in Agriculture
RPA 508	Development of Domestic Markets for Farm Products
RPA 509	Performance of Marketing Systems
RPA 601	Foreign Market Development
RPA 603	Technical Assistance to Developing Countries
RPA 604	Product Development & Marketing for Foreign Markets
RPA 701	Insure Food Products Free of Toxic Contaminants including Residues from Agricultural & Other Sources
RPA 702	Protect Food & Feed Supplies from Harmful Microorganisms & Naturally Occurring Toxins
RPA 703	Food Choices, Habits & Consumption
RPA 704	Home & Commercial Food Service
RPA 708	Human Nutrition
RPA 808	Government Programs to Balance Farm Output & Market Demand
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

1300 Ornamentals and turf

RPA 603	Technical Assistance to Developing Countries
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
RPA 905	Trees to Enhance Rural & Urban Environment
RPA 906	Culture & Protection of Ornamentals & Turf (Same RPA's applicable to 1400-2000, and 2300-2500 and 2700)

1400	Corn
1500	Grain Sorghum
1600	Rice
1700	Wheat
1800	Other Small Grain
1900	Pasture
2000	Forage Crops
2300	Soybeans
2400	Peanuts
2500	Other Oilseed & Oil Crops (excluding cottonseed)
2700	Sugar Crops

RPA 207	Control of Insects, Mites, Snails & Slugs Affecting Field Crops & Range
RPA 208	Control of Diseases & Nematodes of Field Crops & Range
RPA 209	Control of Weeds & Other Hazards of Field Crops & Range
RPA 214	Protection of Plants, Animals & Man from Harmful Effects of Pollution
RPA 307	Improvement of Biological Efficiency of Field Crops
RPA 308	Mechanization of Production of Field Crops
RPA 309	Production Management Systems for Field Crops
RPA 405	Production of Field Crops with Improved Acceptability

1400-2000, 2300-2500, 2700 (Continued) - Same RPA's applicable

RPA 406	New & Improved Food Products from Field Crops
RPA 407	New & Improved Feed Textile & Industrial Products from Field Crops
RPA 408	Quality Maintenance in Storing & Marketing Field Crops
RPA 501	Improvement of Grades & Standards - Crop & Animal Products
RPA 503	Efficiency in Marketing Agricultural Products & Production Inputs
RPA 506	Supply, Demand, & Price Analysis - Crop & Animal Products
RPA 507	Competitive Interrelationships in Agriculture
RPA 508	Development of Domestic Markets for Farm Products
RPA 509	Performance of Marketing Systems
RPA 601	Foreign Market Development
RPA 603	Technical Assistance to Developing Countries
RPA 604	Product Development of Marketing for Foreign Markets
RPA 701	Insure Food Products Free of Toxic Contaminants Including Residues from Agricultural & Other Sources
RPA 702	Protect Food & Feed Supplies from Harmful Microorganisms & Naturally Occurring Toxins
RPA 703	Food Choices, Habits, & Consumption
RPA 704	Home & Commercial Food Service
RPA 708	Human Nutrition
RPA 808	Government Programs to Balance Farm Output & Market Demand
RPA 901	Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

2100 Cotton, including cottonseed for planting purposes

RPA 207	Control of Insects, Mites, Snails & Slugs Affecting Field Crops & Range
RPA 208	Control of Diseases & Nematodes of Field Crops & Range
RPA 209	Control of Weeds & Other Hazards of Field Crops & Range
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 307	Improvement of Biological Efficiency of Field Crops
RPA 308	Mechanization of Production of Field Crops
RPA 309	Production Management Systems for Field Crops
RPA 405	Production of Field Crops with Improved Acceptability
RPA 407	New & Improved Feed, Textile, & Industrial Products from Field Crops
RPA 408	Quality Maintenance in Storing & Marketing Field Crops
RPA 501	Improvement of Grades & Standards - Crop & Animal Products
RPA 503	Efficiency in Marketing Agricultural Products & Production Inputs
RPA 506	Supply, Demand, & Price Analysis - Crop & Animal Products
RPA 507	Competitive Interrelationships in Agriculture
RPA 508	Development of Domestic Markets for Farm Products
RPA 509	Performance of Marketing Systems
RPA 601	Foreign Market Development
RPA 603	Technical Assistance to Developing Countries
RPA 604	Product Development & Marketing for Foreign Markets
RPA 709	Reduction of Hazards to Health & Safety
RPA 808	Government Programs to Balance Farm Output & Market Demand
RPA 901	Alleviation of Soil, Water & Air Pollution & Disposal of Wastes

2200 Cottonseed (for meal, oil, etc.)

- RPA 405 Production of Field Crops with Improved Acceptability
- RPA 406 New & Improved Food Products from Field Crops
- RPA 407 New & Improved Feed, Textile, & Industrial Products from Field Crops
- RPA 408 Quality Maintenance in Storing & Marketing Field Crops
- RPA 501 Improvement of Grades & Standards - Crop & Animal Products
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
- RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
- RPA 507 Competitive Interrelationships in Agriculture
- RPA 508 Development of Domestic Markets for Farm Products
- RPA 509 Performance of Marketing Systems
- RPA 601 Foreign Market Development
- RPA 603 Technical Assistance to Developing Countries
- RPA 604 Product Development & Marketing for Foreign Markets
- RPA 701 Insure Food Products Free of Toxic Contaminants Including Residues from Agricultural & Other Sources
- RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms & Naturally Occurring Toxins
- RPA 703 Food Choices, Habits, & Consumption
- RPA 704 Home & Commercial Food Service
- RPA 708 Human Nutrition
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

2600 Tobacco

- RPA 207 Control of Insects, Mites, Snails & Slugs Affecting Field Crops & Range
- RPA 208 Control of Diseases & Nematodes of Field Crops & Range
- RPA 209 Control of Weeds & Other Hazards of Field Crops & Range
- RPA 214 Protection of Plants, Animals, & Man from Harmful Effects of Pollution
- RPA 307 Improvement of Biological Efficiency of Field Crops
- RPA 308 Mechanization of Production of Field Crops
- RPA 309 Production Management Systems for Field Crops
- RPA 405 Production of Field Crops with Improved Acceptability
- RPA 407 New & Improved Feed, Textile, & Industrial Products from Field Crops
- RPA 408 Quality Maintenance in Storing & Marketing Field Crops
- RPA 501 Improvement of Grades & Standards - Crop & Animal Products
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
- RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
- RPA 507 Competitive Interrelationships in Agriculture
- RPA 508 Development of Domestic Markets for Farm Products
- RPA 509 Performance of Marketing Systems
- RPA 601 Foreign Market Development
- RPA 603 Technical Assistance to Developing Countries
- RPA 604 Product Development & Marketing for Foreign Markets
- RPA 709 Reduction of Hazards to Health & Safety
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

2800

Miscellaneous & New Crops

- RPA 204 Control of Insects, Mites, Slugs, & Snails on Fruit & Vegetable Crops
- RPA 205 Control of Diseases & Nematodes of Fruit & Vegetable Crops
- RPA 206 Control of Weeds & Other Hazards to Fruit & Vegetable Crops
- RPA 207 Control of Insects, Mites, Snails & Slugs Affecting Field
Crops & Range
- RPA 208 Control of Diseases & Nematodes of Field Crops & Range
- RPA 209 Control of Weeds & Other Hazards of Field Crops & Range
- RPA 214 Protection of Plants, Animals, & Man from Harmful Effects
of Pollution
- RPA 304 Improvement of Biological Efficiency of Fruit & Vegetable Crops
- RPA 305 Mechanization of Fruit & Vegetable Crop Production
- RPA 306 Production Management Systems for Fruits & Vegetables
- RPA 307 Improvement of Biological Efficiency of Field Crops
- RPA 308 Mechanization of Production of Field Crops
- RPA 309 Production Management Systems for Field Crops
- RPA 402 Production of Fruit & Vegetable Crops with Improved Acceptability
- RPA 403 New & Improved Fruit & Vegetable Products & By-Products
- RPA 404 Quality Maintenance in Storing & Marketing Fruits & Vegetables
- RPA 405 Production of Field Crops with Improved Acceptability
- RPA 406 New & Improved Food Products from Field Crops
- RPA 407 New & Improved Feed, Textile, & Industrial Products from
Field Crops
- RPA 408 Quality Maintenance in Storing & Marketing Field Crops
- RPA 501 Improvement of Grades & Standards - Crop & Animal Products
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
- RPA 506 Supply, Demand, and Price Analysis - Crop & Animal Products
- RPA 507 Competitive Interrelationships in Agriculture
- RPA 508 Development of Domestic Markets for Farm Products
- RPA 509 Performance of Marketing Systems
- RPA 601 Foreign Market Development
- RPA 603 Technical Assistance to Developing Countries
- RPA 604 Product Development & Marketing for Foreign Markets
- RPA 701 Insure Food Products Free of Toxic Contaminants Including
Residues from Agricultural & Other Sources
- RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms &
Naturally Occurring Toxins
- RPA 703 Food Choices, Habits, & Consumption
- RPA 704 Home & Commercial Food Service
- RPA 708 Human Nutrition
- RPA 709 Reduction of Hazards to Health & Safety
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes

(Same RPA's applicable to 2900-3400)

2900

Poultry

3000

Beef Cattle

3100

Dairy Cattle

3200

Swine

3300

Sheep and Wool

2900, 3000, 3100, 3200, 3300, 3400 (continued) - Same RPA's applicable

- 3400 Other Animals (See 0850 for fur-bearing animals)
- RPA 210 Control of Insects & External Parasites Affecting Livestock, Poultry, & Other Animals
 - RPA 211 Control of Diseases of Livestock, Poultry, & Other Animals
 - RPA 212 Control of Internal Parasites of Livestock, Poultry, & Other Animals
 - RPA 213 Protect Livestock, Poultry, & Other Animals from Toxic Chemicals, Poisonous Plants, & Other Hazards
 - RPA 214 Protection of Plants, Animals, & Man from Harmful Effects of Pollution
 - RPA 310 Reproductive Performance of Livestock, Poultry, & Other Animals
 - RPA 311 Improvement of Biological Efficiency in Production of Livestock, Poultry, & Other Animals
 - RPA 312 Environmental Stress in Production of Livestock, Poultry, & Other Animals
 - RPA 313 Production Management Systems for Livestock, Poultry, & Other Animals
 - RPA 317 Mechanization & Structures Used in Production of Livestock, Poultry, & Other Animals
 - RPA 409 Production of Animal Products with Improved Acceptability
 - RPA 410 New & Improved Meat, Milk, Eggs, & Other Animal Food Products
 - RPA 411 New & Improved Non-Food Animal Products
 - RPA 412 Quality Maintenance in Marketing Animal Products
 - RPA 501 Improvement of Grades & Standards - Crop & Animal Products
 - RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
 - RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
 - RPA 507 Competitive Interrelationships in Agriculture
 - RPA 508 Development of Domestic Markets for Farm Products
 - RPA 509 Performance of Marketing Systems
 - RPA 601 Foreign Market Development
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 604 Product Development & Marketing for Foreign Markets
 - RPA 701 Insure Food Products Free of Toxic Contaminants Including Residues from Agricultural & Other Sources
 - RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms & Naturally Occurring Toxins
 - RPA 703 Food Choices, Habits, & Consumption
 - RPA 704 Home & Commercial Food Service
 - RPA 708 Human Nutrition
 - RPA 807 Structural Changes in Agriculture
 - RPA 808 Government Programs to Balance Farm Output & Market Demand
 - RPA 901 Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
- 3500 Bees & Honey & Other Pollinating Insects
- RPA 314 Bees & Other Pollinating Insects
 - RPA 603 Technical Assistance to Developing Countries

- 3600 General Purpose Supplies (Includes Machinery, Equipment, Fertilizers, Feedstuffs, and Pesticides)
- RPA 315 Improvement of Structures, Facilities, & General Purpose Farm Supplies & Equipment
 - RPA 317 Mechanization & Structures Used in Production of Livestock, Poultry, & Other Animals
 - RPA 501 Improvement of Grades & Standards - Crop & Animal Products
 - RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
 - RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
 - RPA 507 Competitive Interrelationships in Agriculture
 - RPA 508 Development of Domestic Markets for Farm Products
 - RPA 509 Performance of Marketing Systems
 - RPA 513 Supply, Demand & Price Analysis - Forest Products
 - RPA 601 Foreign Market Development
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 604 Product Development & Marketing for Foreign Markets
 - RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms & Naturally Occurring Toxins
 - RPA 709 Reduction of Hazards to Health & Safety
 - RPA 901 Alleviation of Soil, Water & Air Pollution & Disposal of Wastes
 - RPA 904 Fish & Other Marine Life, Fur-Bearing Animals, & Other Wildlife
- 3700 Clothing and Textiles
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
 - RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
 - RPA 507 Competitive Interrelationships in Agriculture
 - RPA 508 Development of Domestic Markets for Farm Products
 - RPA 509 Performance of Marketing Systems
 - RPA 601 Foreign Market Development
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 604 Product Development & Marketing for Foreign Markets
 - RPA 705 Selection & Care of Clothing & Household Textiles
 - RPA 706 Control of Insect Pests of Man & His Belongings
- 3800 Food (Not readily associated with specific plant and animal products)
- RPA 318 Non-Commodity-Oriented Biological Technology & Biometry
 - RPA 403 New & Improved Fruit & Vegetable Products & By-Products
 - RPA 404 Quality Maintenance in Storing & Marketing Fruits & Vegetables
 - RPA 405 Production of Field Crops with Improved Acceptability
 - RPA 406 New & Improved Food Products from Field Crops
 - RPA 408 Quality Maintenance in Storing & Marketing Field Crops
 - RPA 409 Production of Animal Products with Improved Acceptability
 - RPA 410 New & Improved Meat, Milk, Eggs, & Other Animal Food Products
 - RPA 412 Quality Maintenance in Marketing Animal Products
 - RPA 501 Improvement of Grades & Standards - Crop & Animal Products
 - RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs Foreign

- 3800 Food (Continued)
- RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
 - RPA 507 Competitive Interrelationships in Agriculture
 - RPA 508 Development of Domestic Markets for Farm Products
 - RPA 509 Performance of Marketing Systems
 - RPA 601 Foreign Market Development
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 604 Product Development & Marketing for Foreign Markets
 - RPA 701 Insure Food Products Free of Toxic Contaminants including
Residues from Agricultural and Other Sources
 - RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms &
Naturally Occurring Toxins
 - RPA 703 Food Choices, Habits, & Consumption
 - RPA 704 Home & Commercial Food Service
 - RPA 708 Human Nutrition
- 3900 Structures & Facilities
- RPA 106 Efficient Drainage & Irrigation Systems & Facilities
 - RPA 107 Watershed Protection & Management
 - RPA 315 Improvement of Structures, Facilities, & General Purpose
Farm Supplies & Equipment
 - RPA 317 Mechanization & Structures Used in Production of Livestock,
Poultry, & Other Animals
 - RPA 401 New & Improved Forest Products
 - RPA 503 Efficiency in Marketing Agricultural Products & Production
Inputs
 - RPA 509 Performance of Marketing Systems
 - PRA 513 Supply, Demand & Price Analysis - Forest Products
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 706 Control of Insect Pests of Man & His Belongings
 - RPA 709 Reduction of Hazards to Health & Safety
 - RPA 801 Housing
 - RPA 901 Alleviation of Soil, Water, & Air Pollution & Disposal of Wastes
 - RPA 904 Fish & Other Marine Life, Fur-Bearing Animals & Other Wildlife
- 4000 People as Individual Workers, Consumers, and Members of Society
- RPA 214 Protection of Plants, Animals, & Man from Harmful Effects
of Pollution
 - RPA 603 Technical Assistance to Developing Countries
 - RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms &
Naturally Occurring Toxins
 - RPA 703 Food Choices, Habits, & Consumption
 - RPA 706 Control of Insect Pests of Man & His Belongings
 - RPA 707 Prevent Transmission of Animal Diseases & Parasites to Man
 - RPA 708 Human Nutrition
 - RPA 709 Reduction of Hazards to Health & Safety
 - RPA 801 Housing
 - RPA 802 Individual & Family Decision Making & Resource Use &
Family Functioning

- 4000 People as Individual Workers, Consumers, and
 Members of Society (Continued)
- RPA 803 Causes of Poverty Among Rural People
- RPA 804 Improvement of Economic Potential of Rural People
- RPA 805 Communication & Education Processes
- RPA 806 Individual & Family Adjustment to Change
- RPA 907 Improved Income Opportunities in Rural Communities
- 4100 The Family and Its Members
- RPA 603 Technical Assistance to Developing Countries
- RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms &
 Naturally Occurring Toxins
- RPA 703 Food Choices, Habits, & Consumption
- RPA 707 Prevent Transmission of Animal Diseases & Parasites to Man
- RPA 708 Human Nutrition
- RPA 801 Housing
- RPA 802 Individual & Family Decision Making & Resource Use &
 Family Functioning
- RPA 803 Causes of Poverty Among Rural People
- RPA 804 Improvement of Economic Potential of Rural People
- RPA 805 Communication & Education Processes
- RPA 806 Individual & Family Adjustment to Change
- RPA 907 Improved Income Opportunities in Rural Communities
- 4200 The Farm as a Business Enterprise
- RPA 316 Farm Business Management
- RPA 603 Technical Assistance to Developing Countries
- RPA 807 Structural Changes in Agriculture
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- 4300 Communities, Areas and Regions, Including Counties and States
 and Their Institutions and Organizations
- RPA 603 Technical Assistance to Developing Countries
- RPA 803 Causes of Poverty Among Rural People
- RPA 805 Communication & Education Processes
- RPA 806 Individual & Family Adjustment to Change
- RPA 907 Improved Income Opportunities in Rural Communities
- RPA 908 Improvement of Rural Community Institutions & Services
- 4400 Agricultural Economy of United States and Sectors Thereof,
 Including Interrelationships with the Total Economy
- RPA 506 Supply, Demand, & Price Analysis - Crop & Animal Products
- RPA 601 Foreign Market Development
- RPA 603 Technical Assistance to Developing Countries
- RPA 807 Structural Changes in Agriculture
- RPA 808 Government Programs to Balance Farm Output & Market Demand

- 4500 Agricultural Economy of Foreign Countries and Sectors Thereof,
Including Interrelationships with the Total Economy
- RPA 601 Foreign Market Development
 RPA 602 Evaluation of Foreign Food Aid Programs
 RPA 603 Technical Assistance to Developing Countries
- (Same RPA's applicable to 4600 and 4700)
- 4600 Farmer Cooperatives
- 4700 Marketing, Processing & Supply Firms Other than Cooperatives
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
 RPA 508 Development of Domestic Markets for Farm Products
 RPA 509 Performance of Marketing Systems
 RPA 510 Group Action & Market Power
 RPA 603 Technical Assistance to Developing Countries
 RPA 704 Home & Commercial Food Service
 RPA 807 Structural Changes in Agriculture
- 4800 Marketing Systems and Sectors Thereof
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
 RPA 509 Performance of Marketing Systems
 RPA 510 Group Action & Market Power
 RPA 603 Technical Assistance to Developing Countries
 RPA 807 Structural Changes in Agriculture
- 6100 Weeds
- RPA 318 Non-Commodity-Oriented Biological Technology & Biometry
 RPA 603 Technical Assistance to Developing Countries
 RPA 701 Insure Food Products Free of Toxic Contaminants Including
 Residues from Agricultural and Other Sources
- 6200 Seed Research
- RPA 318 Non-Commodity-Oriented Biological Technology & Biometry
 RPA 501 Improvement of Grades & Standards - Crop & Animal Products
 RPA 603 Technical Assistance to Developing Countries
 RPA 702 Protect Food & Feed Supplies from Harmful Microorganisms &
 Naturally Occurring Toxins
- 6300 Biological Cell Systems
- RPA 318 Non-Commodity-Oriented Biological Technology & Biometry
 RPA 603 Technical Assistance to Developing Countries
 RPA 701 Insure Food Products Free of Toxic Contaminants Including
 Residues from Agricultural & Other Sources

6400	Experimental Design and Statistical Methods
RPA 318	Non-Commodity-Oriented Biological Technology & Biometry
RPA 511	Improvement in Agricultural Statistics
RPA 603	Technical Assistance to Developing Countries
6500	Invertebrates (Including Insects, Mites, Ticks, Snails, Slugs, and Leeches)
RPA 318	Non-Commodity-Oriented Biological Technology & Biometry
RPA 603	Technical Assistance to Developing Countries
RPA 706	Control of Insect Pests of Man & His Belongings
6600	Microorganisms, Viruses, etc.
RPA 318	Non-Commodity-Oriented Biological Technology & Biometry
RPA 603	Technical Assistance to Developing Countries
6700	Plants
RPA 204	Control of Insects, Mites, Slugs, & Snails on Fruit & Vegetable Crops
RPA 205	Control of Diseases & Nematodes of Fruit & Vegetable Crops
RPA 206	Control of Weeds & Other Hazards to Fruit & Vegetable Crops
RPA 207	Control of Insects, Mites, Snails, & Slugs Affecting Field Crops & Range
RPA 208	Control of Diseases & Nematodes of Field Crops & Range
RPA 209	Control of Weeds & Other Hazards of Field Crops & Range
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 304	Improvement of Biological Efficiency of Fruit & Vegetable Crops
RPA 305	Mechanization of Fruit & Vegetable Crop Production
RPA 306	Production Management Systems for Fruits & Vegetables
RPA 307	Improvement of Biological Efficiency of Field Crops
RPA 308	Mechanization of Production of Field Crops
RPA 309	Production Management Systems for Field Crops
RPA 315	Improvement of Structures, Facilities & General Purpose Farm Supplies & Equipment
RPA 318	Non-Commodity-Oriented Biological Technology & Biometry
RPA 402	Production of Fruit & Vegetable Crops with Improved Acceptability
RPA 403	New & Improved Fruit & Vegetable Products & By-products
RPA 404	Quality Maintenance in Storing & Marketing Fruits & Vegetables
RPA 405	Production of Field Crops with Improved Acceptability
RPA 406	New & Improved Food Products from Field Crops
RPA 407	New & Improved Feed, Textile, & Industrial Products from Field Crops
RPA 408	Quality Maintenance in Storing & Marketing Field Crops
RPA 501	Improvement of Grades & Standards - Crop & Animal Products
RPA 503	Efficiency in Marketing Agricultural Products & Production Inputs
RPA 506	Supply, Demand & Price Analysis - Crop & Animal Products
RPA 507	Competitive Interrelationships in Agriculture
RPA 508	Development of Domestic Markets for Farm Products

6700 Plants (Continued)

- RPA 509 Performance of Marketing Systems
- RPA 603 Technical Assistance to Developing Countries
- RPA 701 Insure Food Products Free of Toxic Contaminants Including Residues
Agricultural & Other Sources
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water & Air Pollution & Disposal of Wastes

6800 Animals (Vertebrates)

- RPA 210 Control of Insects, & External Parasites Affecting Livestock,
Poultry, & Other Animals
- RPA 211 Control of Diseases of Livestock, Poultry & Other Animals
- RPA 212 Control of Internal Parasites of Livestock, Poultry, & Other Animals
- RPA 213 Protect Livestock, Poultry & Other Animals from Toxic Chemicals,
Poisonous Plants, & Other Hazards
- RPA 310 Reproductive Performance of Livestock, Poultry & Other Animals
- RPA 311 Improvement of Biological Efficiency in Production of Livestock,
Poultry & Other Animals
- RPA 312 Environmental Stress in Production of Livestock, Poultry
& Other Animals
- RPA 313 Production Management Systems for Livestock, Poultry & Other Animals
- RPA 315 Improvement of Structures, Facilities & General Purpose Farm
Supplies & Equipment
- RPA 317 Mechanization & Structures Used in Production of Livestock,
Poultry & Other Animals
- RPA 318 Non-Commodity-Oriented Biological Technology & Biometry
- RPA 409 Production of Animal Products with Improved Acceptability
- RPA 410 New & Improved Meat, Milk, Eggs, & Other Animal Food Products
- RPA 411 New & Improved Non-Food Animal Products
- RPA 412 Quality Maintenance in Marketing Animal Products
- RPA 501 Improvement of Grades & Standards - Crop & Animal Products
- RPA 503 Efficiency in Marketing Agricultural Products & Production Inputs
- RPA 506 Supply, Demand & Price Analysis - Crop & Animal Products
- RPA 507 Competitive Interrelationships in Agriculture
- RPA 508 Development of Domestic Markets for Farm Products
- RPA 509 Performance of Marketing Systems
- RPA 603 Technical Assistance to Developing Countries
- RPA 701 Insure Food Products Free of Toxic Contaminants Including
Residues Agricultural & Other Sources
- RPA 808 Government Programs to Balance Farm Output & Market Demand
- RPA 901 Alleviation of Soil, Water & Air Pollution & Disposal of Wastes

6900 Research on Research Management (Not research management per se)

- RPA 114 Research on Management of Research
- RPA 603 Technical Assistance to Developing Countries

7000	Research Equipment & Technology (Such as Remote Sensing)
RPA 109	Adaptation to Weather & Weather Modification
RPA 110	Appraisal of Forest & Range Resources
RPA 111	Biology, Culture & Management of Forests & Timber-Related Crops
RPA 113	Remote Sensing
RPA 214	Protection of Plants, Animals, & Man from Harmful Effects of Pollution
RPA 302	New & Improved Forest Engineering Systems
RPA 304	Improvement of Biological Efficiency of Fruit & Vegetable Crops
RPA 318	Non-Commodity-Oriented Biological Technology & Biometry
RPA 511	Improvement in Agricultural Statistics
RPA 603	Technical Assistance to Developing Countries

TABLE "C"CLASSIFICATION CODESHEET FOR REPORT OF AGRICULTURAL RESEARCH(5) FIELD OF SCIENCEBiological

0110	Biochemistry and biophysics - animal	0910	Nutrition and Metabolism - animal
0112	Biochemistry and biophysics - plant	0912	Nutrition and Metabolism - plant
0113	Biochemistry and biophysics - human	0913	Nutrition and Metabolism - human
0114	Biochemistry and biophysics - other	0914	Nutrition and Metabolism - other
0210	Biology - Environmental, systematic, applied - animal	1010	Parasitology - animal
0212	Biology - Environmental, systematic, applied - plant	1012	Parasitology - plant
0213	Biology - Environmental, systematic, applied - human	1013	Parasitology - other
0214	Biology - Environmental, systematic, applied - other	1110	Pathology - animal
0310	Biology - Molecular - animal	1112	Pathology - plant
0312	Biology - Molecular - plant	1113	Pathology - human
0313	Biology - Molecular - other	1114	Pathology - other
0410	Entomology - animal	1210	Pharmacology
0412	Entomology - plant	1310	Physiology - animal
0413	Entomology - human	1312	Physiology - plant
0414	Entomology - other	1313	Physiology - other
0510	Animal Genetics and Breeding	1410	Virology - animal
0512	Plant Genetics and Breeding	1412	Virology - plant
0513	Genetics - other	1413	Virology - human
		1414	Virology - other

Physical

0610	Immunology - animal	1524	Chemistry - analytical
0612	Immunology - plant	1525	Chemistry - inorganic
0613	Immunology - human	1526	Chemistry - organic
0710	Microbiology - animal	1527	Chemistry - physical
0712	Microbiology - plant	1528	Chemistry - soils
0713	Microbiology - human	1529	Chemistry - other
0714	Microbiology - soils		
0790	Microbiology - other		
0810	Nematology - animal		
0812	Nematology - plant		
0813	Nematology - other		

TABLE "C" (Continued)Physical (continued)

1920 Engineering - agricultural
 1924 Engineering - mechanical
 1925 Engineering - electrical
 1926 Engineering - civil
 1927 Engineering - chemical
 1928 Engineering - industrial
 1929 Engineering - other

 2020 Geology and geography

 2120 Hydrology

 2220 Mathematics
 2230 Statistics and biometry
 2320 Meteorology and climatology

 2420 Physics
 2421 Physics - soils

Social and Behavioral

2530 Anthropology
 2630 Economics
 2730 Education
 2740 Information and Communication
 2830 History

 2930 Law
 3030 Political Science
 3130 Psychology
 3230 Sociology
 3310 Art and Architecture

Pages 45 through 49 are reproduced with a few changes from Pages 32 through 37 of A National Program of Research for Agriculture.

Report of a Study Sponsored Jointly by:
Association of State Universities and
Land Grant Colleges and U.S. Department
of Agriculture.

October 1966.

GOALS OF AGRICULTURAL RESEARCH

"The paramount goal of the United States was set long ago. It is to guard the rights of the individual, to ensure his development, and to enlarge his opportunity. It is set forth in the Declaration of Independence drafted by Thomas Jefferson and adopted by the Continental Congress on July 4, 1776."^{1/}

This ultimate goal may be translated into such generally accepted overall national objectives as increasing the gross national product of the country and personal wealth of individuals, improving the level of living for all Americans, preserving peace throughout the world, continuing a strong defense posture, maintaining a high level of employment, conserving and developing our national resources, and sustaining the freedom of individuals.

Attainment of these national objectives, or goals, is dependent upon a sound and prosperous agricultural industry. Research provides the information which makes possible the development and maintenance of such an industry.

The responsibilities of the Federal Government in agricultural and forestry research are revealed in the Organic Act establishing the Department of Agriculture, the Hatch Act granting aid to the State Agricultural Experiment Stations, the McSweeney-McNary Act authorizing forestry research, and the McIntire-Stennis Act extending assistance to the States for forestry research. The first declared: "There shall be at the seat of government a Department of Agriculture, the general design and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture, in the most general and comprehensive sense of that word. . .".

The Hatch Act stated, "It shall be the object and duty of the State Agricultural Experiment Stations . . . to conduct original and other researches, investigations, and experiments bearing directly on and contributing to the establishment and maintenance of a permanent and effective agricultural industry of the United States, including researches basic to the problem of agriculture in its broadest aspects, and such investigations as have for their purpose the development and improvement of the rural home and rural life and the maximum contribution by agriculture to the welfare of the consumer, as may be deemed advisable, having due regard to the varying conditions and needs of the respective states."

^{1/} Goals for Americans, the Report of the President's Commission on National Goals, Prentice-Hall, Inc., 1960.

The McSweeney-McNary Act authorized and directed the Secretary of Agriculture "to conduct such investigations, experiments, and tests as he may deem necessary . . . to determine, demonstrate, and promulgate the best methods of reforestation and growing, managing, and utilizing timber, forage, and other forest products, or maintaining favorable conditions of water flow, and the prevention of erosion, of protecting timber and other forest growth from fire, insects, disease, or other harmful agents, of obtaining the fullest and most effective use of forest lands, and to determine and promulgate the economic consideration which should underlie the establishment of sound policies for the management of forest land and the utilization of forest products, . . .".

The McIntire-Stennis Act authorized the Secretary of Agriculture "to cooperate with the several states for the purpose of encouraging and assisting them in carrying out programs of forestry research."

One of the first activities of the joint USDA-SAES staff was to develop goal statements for research that would enable agriculture to fulfill its role in meeting overall national objectives. These goals of agricultural research provide the framework for developing projections of the future needs of people; for evaluating the contribution that can be made by current research programs; and for recommending adjustments that we must make.

Basic research is such a vitally necessary element of research conducted under each goal that it stands by itself as a specific research goal where it undergirds all mission-oriented research and contributes to the store of new fundamental knowledge. Much basic research is also done as a part of each goal, where specific fundamental knowledge needed must be obtained in order to provide the basis for developing practical solutions to problems facing agriculture.

Agricultural and forestry research is designed to enable agriculture to attain the following 10 goals. The first 9 of these goals were developed and ordered to fit as close as possible to the principal groupings of research objectives as outlined in the ACTIVITY column of the classification system, which we presented in Table 1. The basic research goal serves to emphasize the importance we attach to basic research, even though our inventory and projections carry it as an integral part of each of the other 9 goals.

I. Insure a stable and productive agriculture for the future through wise management of natural resources.

The Nation's natural resources, including soil, water, forest, and range, provide the basis for economic growth and an adequate supply of farm and forest products. Essential natural resources must be maintained, developed, and used to meet production and general welfare needs. This involves reducing soil erosion and controlling water runoff. It includes increasing our efforts to improve forest management. By the year 2000, annual timber growth is projected to fall short of cut by about 16 percent, or 13 billion board feet.

RPA's 101-114, inclusive: Pages 51-65, inclusive

II. Protect forests, crops and livestock from insects, diseases, and other hazards.

Lower unit costs and reduced risks result from eradication or control of diseases and pests and elimination of such hazards of the environment as climatic extremes, pollution, and other stresses. Serious fluctuations in farm and forest product supplies can be avoided when these production hazards are reduced or eliminated.

RPA's 201-214, inclusive: Pages 67-81, inclusive

III. Produce an adequate supply of farm and forest products at decreasing real production costs.

Food and fiber supplies must be increased about 40 percent in order to meet domestic needs 32 percent higher and an export goal 100 percent higher in 1980 than now. For the year 2000, these supplies must be increased 111 percent to meet 75 percent higher domestic needs and a 200 percent higher export goal. Domestic needs for forest products will be up an estimated 80 percent by 2000. Consumption of farm and forest products can be increased and their competitive position in domestic and foreign markets improved by reducing production costs. Of particular concern are those farm products which are under pressure from synthetics and imports.

RPA's 301-318, inclusive: Pages 83-102, inclusive

IV. Expand the demand for farm and forest products by developing new and improved products and processes and enhancing product quality.

Increasing domestic demand and improving markets abroad depend upon satisfying consumer preferences for high quality food, fiber, and forest products. This means tailoring products to meet consumer desires. More effort should be given to producing products with characteristics that meet consumer or processor needs and maintaining these qualities to point of use. New and improved uses and processes will result in more variety, reduced costs, and increased utilization of farm and forest products.

RPA's 401-412, inclusive: Pages 104-116, inclusive

V. Improve efficiency in the marketing system.

The larger share of the consumer dollar is being spent for marketing rather than producing farm and forest products. The potential is great for reducing marketing costs. Greater efficiency of assembling, handling, processing, packaging, storing, transporting, wholesaling, and retailing farm and forest products would reduce prices paid by consumers, increase returns to farmers and marketers, and expand markets.

RPA's 501-503, 506-513, inclusive: Pages 118-129, inclusive

VI. Expand export markets and assist developing nations.

Our agricultural products contribute prominently to our balance of payments position. The potential is far greater. We need more and better sales promotion efforts. We need to direct more effort toward

VI. (continued)

producing and marketing to meet specific market preferences and to developing preferences for desirable attributes our products already have. We need much more knowledge of how to establish foreign markets, how to organize production and marketing to meet export demand, and what potential our products have in foreign markets. Our goal should be to double farm product exports by 1980 and triple them by 2000.

Our sense of moral responsibility impels us to help people in need. At the same time our abundant food, fiber, and agricultural technology represent our most effective instrument of foreign policy. Agricultural and forestry technical assistance will help developing nations produce more of their own food needs, contribute to their economic growth, and lead to expanded export markets for us. Our productive capacity can serve a useful and humanitarian purpose in helping to feed hungry people wherever the need exists. Much ingenuity will be required in order to accomplish this humanitarian objective without upsetting world markets and internal economies of the countries involved.

RPA's 601-604, inclusive: Pages 131-134, inclusive

VII. Protect consumer health and improve nutrition and well-being of the American people.

The public expects agriculture to produce and market foods that it can buy with confidence. This means food that is wholesome and free from harmful pesticide residues, disease agents or toxic substances. While this nation has a food supply that cannot be surpassed for wholesomeness anywhere else in the world, there is ample room for improvement, particularly with respect to microbiological safety and chemical residues. Also, we are concerned with helping people in the selection, construction, and care of clothing and textiles, and in controlling insect pests of man and his belongings.

In spite of our abundant food supply, about 10 percent of our families have poor diets. We should be able to reduce this to 5 percent by 1980 and 1 percent by 2000. We have better knowledge of optimum diets for some of our livestock than for our people. We need to know how to blend our plentiful food supply into better diets for buoyant health and longevity.

RPA's 701-709, inclusive: Pages 136-145, inclusive

VIII. Assist rural Americans to improve their level of living.

Median farm family income in 1960 was only half that of urban families. Rural non-farm family income was about three-fourths that of urban families. Ways must be found to assist rural people in adjusting to structural changes in agriculture and to balance farm output and market demand. This income disparity also can be reduced by improving the economic potential of rural

VIII. (continued)

youth and adults. Also needed is information on how to use money and other resources to achieve desired goals without losing the uniquely desirable aspects of rural life. As rural living becomes more attractive, the migration pressures upon our cities will be reduced.

RPA's 801-808, inclusive: Pages 147-155, inclusive.

IX. Promote community improvement including development of beauty, recreation, environment, economic opportunity, and public services.

Achievement of many aspirations depends upon group action at local, state, and Federal levels to make desired services available. To a considerable measure, availability to individuals of utilities, health services, opportunities for education, employment, and recreation depend upon community action. Community groups, private and public, need facts as a basis for programs that lead to group satisfaction from joint use of economic and natural resources.

RPA's 901-908, inclusive: Pages 157-167, inclusive.

X. Enhance the national capacity to develop and disseminate new knowledge and new or improved methodology for solving current problems or new problems that will arise in the future.

The overall aim of agricultural research is to seek out knowledge in the province of agriculture that will enhance the national goals of the American people. An essential element of a strong research program is to gain new fundamental knowledge. The findings of basic research provide the building blocks to solve problems facing agriculture now and in the future. They also enhance the store of scientific knowledge essential to the country's overall progress and well-being.

Research under Goal X is conducted under all the RPA's of Goals I - IX, inclusive. Pages 51-168, inclusive.

GOAL IINSURE A STABLE AND PRODUCTIVE AGRICULTURE FOR THE FUTURE
THROUGH WISE MANAGEMENT OF NATURAL RESOURCES

The Nation's natural resources, including soil, water, forest, and range, provide the basis for economic growth and an adequate supply of farm and forest products. Essential natural resources must be maintained, developed, and used to meet production and general welfare needs. This involves reducing soil erosion and controlling water runoff. It includes increasing our efforts to improve forest management. By the year 2000, annual timber growth is projected to fall short of cut by about 16 percent, or 13 billion board feet.

RPA's 101-114, inclusive: Pages 51-65, inclusive

RPA 101. APPRAISAL OF SOIL RESOURCES

Agricultural agencies make appraisals of the nation's soil resources through soil classification and mapping the classified soil types. Research in support of soil mapping is concerned with identifying the parameters to be measured, including the correlation of soil map information with the use to be made of the data (e.g., crop production, housing developments, zoning), and the development of effective and economic ways of reporting the results.

In recent years the use of these findings has extended far beyond that made by farmers and ranchers. For example, sanitarians and home builders are using the information for judging the capacity of soils to absorb septic tank effluent; architects and developers use the information for site evaluation and foundation design; urban planners and other public officials use soil surveys for both general and operational planning of land use in rapidly expanding areas. Soil surveys can also be used to show soil characteristics such as susceptibility to frost heave or slippage, depth to water table, depth to rock or other impermeable barriers, bearing strength, flood hazard, and soil erosion potential which affect suitability of a site for specific uses.

Areas of research include:

- (a) Physical, chemical, mechanical and biological characteristics of soils needed in soil classification and management.
- (b) Identification of soil types and their suitability for specific uses.
- (c) Appraisal of how soils behave under different levels of management and use such as crop production, logging, grazing, water utilization and yield, and other agricultural, forestry and non-agricultural uses. This type of research indicates the general type and level of intensity of use to which a tract of land is suited.

Classification Guidelines:

Activities:

4100 Resource description and inventory

Commodities, etc.:

0100 Soil and land

RPA 102. SOIL, PLANT, WATER, NUTRIENT RELATIONSHIPS

This problem area is concerned with the chemical and physical nature of interrelationships among soils, plants, water, and nutrients. The objectives is to improve, maintain, or restore the inherent production capability of soils.

Areas of research include:

- (a) Factors which limit root development of plants.
- (b) Development of practical methods for ameliorating unfavorable conditions, such as, tillage pans, nutrient deficiencies, and improper air-water relationships.
- (c) Ways to maintain and improve soil structure by soil amendments and by soil, crop, tillage and management systems.
- (d) The effect of physical, chemical and biological properties of soils on soil structure, resistance to erosion, availability of plant nutrients, and the general environment for plant roots.
- (e) Chemical changes of nutrient elements in different kinds of soils and the factors affecting uptake by various crops.
- (f) Methods to make beneficial changes in energy dissipation and utilization in the soil-plant-atmosphere relationships.
- (g) Interrelationships between soil properties and aspects of plant physiology.
- (h) Subsidence and fire damage to organic soils.

Exclude: (1) Research that can be considered as "improvement of biological efficiency" when the primary orientation is to the response made by particular plant types (e.g. corn) to variables of soil, plant spacing, fertilizer, water, etc. (Use RPA 304 or 307).

Classification Guidelines:

Activities:

- 4300 Resource development, conservation and management
- 4810 Protection against fire
- 4820 Protection against flood

Commodities, etc.:

- 0100 Soil and Land

RPA 103. MANAGEMENT OF SALINE AND SODIC SOILS AND SALINITY

Injurious accumulations of salts may occur in the root zone of the soil because salts move upward in the soil with water and are left behind as the water evaporates. Salts can be leached downward to the ground water or to a drainage system as the result of heavy rainfall or irrigation.

Salts generally come from irrigation water, but some soils naturally contain excessive quantities. Many complex problems are created by the combination of salts, soils, and climatic conditions and quality of irrigation or leaching water. Disposal of salts without degrading water quality for the down stream user is a critical problem. In the arid West injurious concentrations of salts in the soil have impaired the use of 25 percent of the 34 million acres of irrigated land. Salinity and brackish water problems also occur in seaboard areas.

Areas of research include:

- (a) Leaching theory and methods to predict rates and amounts of various qualities of leaching waters and related drainage system requirements to reclaim soils having salt accumulations.
- (b) Methods of treating and managing saline irrigation water and leaching effluents.
- (c) Management criteria for use of brackish water of various qualities under a wide range of soil, crop, and environmental conditions.
- (d) Tillage, crop, soil amendment, leaching, and profile modification practices for crop production on saline and sodic soils.
- (e) The interactions of soil structure, dissolved and absorbed ions, microbial activity, organic matter, and moisture movement in the root zone of salt-affected soils.
- (f) Procedures and equipment for determining the salinity status of soils and irrigation waters.
- (g) Research on plants or cropping sequences to manage or improve saline soils.
- (h) Breeding and selection of salt tolerant varieties.

Classification Guidelines:

Activities:

4300 Resource development, conservation, and management

Commodities, etc.:

0100 Soil and land
0200 Water

RPA 104. ALTERNATIVE USES OF LAND

Alternative uses of land need to be evaluated to determine which ones will provide the greatest short- and long-range social and economic benefits. Population growth, advances in agricultural technology, changing consumer demands, urban and suburban growth, needs of people at home and abroad, recreational needs, and other factors result in changing demands upon our nation's fixed supply of land. Soil conservation, forestry and water, watersheds, recreation and community development programs and policies should be based upon the relative advantages of alternative land uses.

Areas of research include:

- (a) Inventory and appraisal of current and potential land uses.
- (b) Parameters and models for evaluating economic benefits.
- (c) Appraisal of future land requirements for non-agricultural uses such as forestry, recreation, highway, urban and industrial development.
- (d) Economics of conservation and management programs and practices.
- (e) Factors affecting land use such as:
 - (1) Government programs
 - (2) Tax policies
 - (3) New technology
 - (4) Laws and ordinances
 - (5) Land ownership patterns and trends
 - (6) Population changes

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 4400 Evaluation of alternative uses and methods of use
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0100 Soil and land
- 0200 Water

RPA 105. CONSERVATION AND EFFICIENT USE OF WATER

Virtually all of the Nation's water supply arrives as precipitation upon the land. Seventy percent of this supply is lost through evaporation and transpiration. The remaining 30 percent is subject to increasing competition among agricultural, industrial and domestic users. Increased efficiency in collecting, storing, conveying, using and reusing available supplies becomes essential.

One example of a reclaimable supply is on irrigated farms where about 76 million acre feet of water are lost by evaporation, seepage, wasteful runoff during irrigation, and use by non-beneficial plants.

Areas of research include:

- (a) Moisture and heat flow in soils for more effective procedures to monitor and improve effectiveness of water storage in the soil profile and underground aquifers.
- (b) Improved soil and water conservation systems and residue management systems which will be compatible with modern mechanized agricultural practices.
- (c) Management practices, breeding and selecting of plant varieties, and environmental management practices to make efficient use of water through the various stages of plant growth.
- (d) Alternative practical techniques for reducing water loss from plant, soil and water surfaces.
- (e) Practices to enhance water infiltration, transmission, and use by plants.
- (f) Methods to conserve, replenish and effectively use water in underground storage.
- (g) Research designed to control phreatophytes and aquatic weeds to reduce the damages or losses they cause.

Exclude: (1) Research on aquatic weeds as a pollutant. (Use RPA 901).

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 4300 Resource development, conservation, and management
- 4700 Protection against weeds and their control agents (aquatic and phreatophytes only)
- 4840 Protection against climatic extremes (frost, hail, wind, drought, etc.)

Commodities, etc.:

0200 Water

RPA 106. EFFICIENT DRAINAGE AND IRRIGATION SYSTEMS AND FACILITIES

Excess water is a problem on nearly 60 million acres of cropland. Almost 40 million acres of land are under irrigation management. Water control structures represent expensive features of irrigation and drainage systems. Improved design of facilities and systems will result in more efficient use of land, water, and capital resources.

Areas of research include:

- (a) Theory of water flow for more efficient irrigation system design.
- (b) Methods of automating irrigation systems to reduce labor and increase efficiency.
- (c) New concepts and improved design of drainage systems.
- (d) New materials, systems, equipment, and installation techniques to reduce construction and maintenance costs of drainage and irrigation systems.
- (e) Use of solar energy and air turbulence to speed the drying of poorly drained soils.
- (f) Methods for combining irrigation and drainage systems to increase efficiency of water and system use.
- (g) Improved hydraulic design of water control structures to reduce construction cost and maintain safety of structures.
- (h) Methods for determining irrigation water requirements giving consideration to water use by plants, effective rainfall, and water losses during and following application.
- (i) Equipment for uniform distribution of irrigation water with particular emphases on overhead and subsurface systems.

Classification Guidelines:

Activities:

4300 Resource development, conservation and management

Commodities, etc.:

0100 Soil and land

0200 Water

3900 Structures and facilities (see subcodes)

RPA 107. WATERSHED PROTECTION AND MANAGEMENT

Nearly 12,000 agricultural and forested watersheds in the country are in the size category commonly encompassed in developments under the Watershed Protection and Flood Prevention Act, the Small Reclamation Projects Act, and similar programs. These watersheds include the cropland of the U.S. as well as the range and forest lands. Many of these watersheds need one or more of the following: flood prevention systems, sediment control, wind and water erosion control, and improved management for water yield and quality.

Erosion control is needed to protect the productive capacity of the land. Sediment control is needed to prevent unwanted deposition of eroded material in reservoirs, harbors, stream channels, streets and highways, or on flood-plain lands. Sediment in streams damages recreational values and must be removed from domestic and industrial water supplies.

Areas of research include:

- (a) New concepts and mathematical expressions of the erosion processes by wind and water.
- (b) Procedures for identifying sediment sources, predicting and measuring sediment deposition, and methods for sediment control.
- (c) Measures for controlling erosion on watershed lands and stream channel systems in both rural and urban environments and methods for reclaiming eroded lands.
- (d) Methods for quantifying the role of soil and vegetation in the hydrologic performance of watersheds and river basins and the impact of management practices which change topographic and vegetative characteristics.
- (e) Improved procedures for use of watersheds and river basins to assure needed agricultural and forest products, keep soil erosion and sedimentation to an acceptable minimum, and supply reliable quantities of good quality water for domestic, agricultural, municipal and industrial uses.
- (f) Alternative land and water management practices including cover manipulation to improve the quality, quantity, and timing of surface and sub-surface water yields from watersheds and river basins.
- (g) Alternative systems for managing water storage and movement to reduce floods and dispose of excess water, maintain stable stream channels, and provide water for beneficial uses.
- (h) Design of watershed structures and runoff control systems.

Classification Guidelines:

Activities:

- 4300 Resource development, conservation and management
- 4820 Protection against flood
- 4840 Protection against climatic extremes

Commodities, etc.:

- | | |
|---------------------|--|
| 0100 Soil and land | 0600 Trees, forests, and forest products |
| 0200 Water | (excluding edible tree nut crops) |
| 0300 Watersheds and | 0700 Range |
| river basins | 3900 Structures and facilities |

RPA 108. ECONOMIC AND LEGAL PROBLEMS IN MANAGEMENT OF WATER AND WATERSHEDS

Economically sound watershed and river basin plans are needed because of: (1) an expanding economy pressing on available water resources in some areas while in others, resources are under-employed, (2) production and income stabilization needs, (3) advancing technology, and (4) large capital investments made by public agencies in water resources projects. Also, efficient use of land and water resources is conditioned by laws, administrative regulations and other institutional arrangements which prescribe rules and procedures for transfer, use, and management of resources. Economic management of water in agriculture is an important factor in balanced development and growth of all water-using industries.

Areas of research include:

- (a) Identifying and quantifying the benefits and costs of projects, especially intangible and non-market values such as recreation, beauty, and depressed area redevelopment.
- (b) Zoning of water bodies and river basins for most desirable uses (flood plain occupancy, techniques for minimizing damages and adjusting to floods).
- (c) Identification of potentials for developing major water resources to meet emerging national and regional requirements and objectives.
- (d) Analyses of non-structural alternatives to reduce economic losses from flooding and other water-caused damage.
- (e) Legal and institutional arrangements to achieve equitable and orderly water use and river basin development.
- (f) Advantageous allocation of water among competitive uses.
- (g) Determining benefits derived from wise management and multiple usage of water.
- (h) Evaluating alternatives in watershed and river basin development.

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 4300 Resource development, conservation, and management
- 4400 Evaluation of alternative uses and methods of use
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0200 Water
- 0300 Watershed and river basins (see subcodes)

RPA 109. ADAPTATION TO WEATHER AND WEATHER MODIFICATION

The future holds many possibilities for changes in weather and climate ranging from dramatic major changes to micro-environmental changes around plants and animals. Research in agriculture has three tasks: (1) characterize existing climatic patterns and propose more effective ways of adjusting to these patterns. (2) specify modifications that are clearly desirable to farm and forest, and (3) learn how modifications proposed by others will affect agriculture or natural ecology.

Areas of research include:

- (a) Understanding the sequences and duration of weather events and the response of relevant biota.
- (b) Probabilities of occurrence of weather conditions critical to agricultural operations.
- (c) Methods for incorporating climatology in the strategy, forecasts, and decision-making tactics of agriculture.
- (d) Techniques for direct modification of weather events and elements.
- (e) The biological consequences of weather modification.
- (f) The phenomena of hail and other severe storms.
- (g) Micro-climate and ways to modify it.
- (h) Legal and economic implications and consequences of particular weather modifications.

Exclude: (1) Research on lightning and other weather-related forest fire research. (Use RPA 203).

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 4300 Resource development, conservation, and management
- 7300 Evaluation of public programs, policies and services
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0400 Air and climate
- 7000 Research equipment and technology

RPA 110. APPRAISAL OF FOREST AND RANGE RESOURCES

Periodic appraisals of forest and range resources of the nation are essential to determine the adequacy of public conservation policies and programs and to guide the development of private forest and range enterprises.

The timber resources of the nation, including some 500 million acres of commercial forest land, vary greatly in productivity and availability for industrial use. They show widely divergent trends in growth, depletion and quality. The increasing use of resource data to evaluate future needs for Federal and State forestry programs and to provide guidance for the continuing expansion of wood-using industries in various regions makes it imperative that appraisals of timber resources be intensified and kept up to date.

The range and wildlife habitat resources of the Nation vary widely in productivity, condition, and potential importance for sustaining livestock and wildlife. There is growing need for a comprehensive appraisal of range conditions and opportunities for improving capacity and use to meet future demands for livestock forage, for water yield and for wildlife habitat.

Areas of research include:

- (a) Determination of types of information needed and standards of estimate.
- (b) Improvement of survey methods to reduce costs and increase the usefulness of information obtained, including emphasis on aerial photography, trend projections, and more effective use of computers for analysis of data.
- (c) Appraisals in each state to provide up-to-date information on the quantity, quality, and productivity of forest and range resources to be used in evaluating the Nation's timber and range situation.
- (d) Appraisals for use in development of resource programs.
- (e) Analysis of the timber outlook resulting from alternative management regimes for use in projection systems.

Exclude: (1) Research on use of remote sensing. (Use RPA 113).

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0600 Trees, forests and forest products (see subcodes)
- 0700 Range
- 7000 Research equipment and technology

RPA 111. BIOLOGY, CULTURE AND MANAGEMENT OF FORESTS AND TIMBER-RELATED CROPS

Culture and management are directed at producing adequate supplies at reasonable cost, by methods that harmonize with other forest uses. For the 40 important commercial timber types in the United States, it is necessary to develop techniques for intensive culture and for combining timber culture with other uses. The major job is to find out how to convert wild forests to forests managed for single or multiple objectives, in the shortest time and at least cost. Each type has distinctive silvicultural characteristics.

Research includes investigations of biological processes and ecological relationships, devises improved cultural techniques for commercial and other timber species, including Christmas trees, and better methods for forecasting growth and quality changes in relation to management practices. Thus it provides the basis for selection of economic alternatives.

Improved management of existing and improved varieties offers many opportunities for improving the biological efficiency of trees.

Areas of research include:

- (a) Physiology and ecology of forest trees and plant communities.
- (b) Seed orchard management, seed harvesting, processing, and storage methods.
- (c) Nursery culture, planting, and direct seeding
- (d) Cheaper ways to convert brushfields to timber stands.
- (e) Techniques to encourage natural regeneration to perpetuate desirable forest species.
- (f) Use of prescribed fire and other measures to control competing vegetation and stand composition.
- (g) Planning and techniques for long-term management of forests for timber production in harmony with other uses including wilderness and parks.
- (h) Theory, instrumentation and methods of mensuration for estimating timber growth, yield and quality.
- (i) Cultural techniques including spacing, fertilization, liming, and irrigation for the production of timber-related crops from improved strains.
- (j) Christmas tree culture.

Exclude: (1) Research on improvement of biological efficiency through breeding and selection. (Use RPA 301).
 (2) Research on trees to enhance rural and urban environment. (Use RPA 905).

Classification Guidelines:

Activities:

- 4300 Resource development, conservation and management
- 4700 Protection against weeds and their control agents
- 4850 Protection against birds
- 4860 Protection against rodents and other mammals
- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals

RPA 111. (continued)

Activities: (continued)

- 5200 Mechanization, improvement of physical efficiency, and
development of structures and facilities
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0600 Trees, forests, and forest products (see subcodes)
- 7000 Research equipment and technology

RPA 112. IMPROVEMENT OF RANGE RESOURCES

Research seeks to maintain and improve the productive capacity of range ecosystems. Native range in the United States includes over 900 million acres. It represents a continuum of sites and productivity potential from the deserts of the Southwest to the prairies of the Midwest and from the sea-level grasslands of Florida to the Alpine herblands of the high Rockies. Rangelands are important as a source of feed for beef cattle and sheep, in watershed protection, soil stabilization, wildlife habitat and recreation.

Areas of research include:

- (a) Range characteristics including identification, physiological requirements, and nutritive value of forage plants.
- (b) Understanding range ecosystems and their biotic and physical components.
- (c) Projecting future demand for range forage and other benefits normally related to the wise use of rangelands.
- (d) Improvement through breeding and selection of browse plants for forage as well as for protection and aesthetic purposes.
- (e) Practices for conversion of brush and low-value trees to grassland.
- (f) Revegetation of deteriorated areas by seeding desirable species, including improvement through breeding and selection of range forage plants.
- (g) Systems for managing ranges including fertilization, mechanization, grazing pressure, and drainage so as to increase forage yields.
- (h) Management practices that will harmonize grazing with timber growing, wildlife, recreation, and other land uses.

- Exclude:
- (1) Research on protection from insects, etc. (Use RPA 207).
 - (2) Research on protection from diseases, etc. (Use RPA 208).
 - (3) Research on protection from weeds, etc. (Use RPA 209).
 - (4) Research on protection from fire. (Use RPA 203).
 - (5) Research on protection against poisonous plants. (Use RPA 213).

Classification Guidelines:

Activities:

- 4300 Resource development, conservation and management
- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals
- 5200 Mechanization, improvement of physical efficiency, and development of structures and facilities

Commodities, etc.:

- 0700 Range

RPA 113. REMOTE SENSING

Programs in agriculture and forestry are heavily dependent on having timely information for decision-making. Opportunities for increasing and sustaining the productivity of natural resources and for facilitating product flows in agriculture are dependent on accurate, comprehensive, and timely information on resource use, availability, productivity potential, and other characteristics. The paucity of such information is a major obstacle in the economic development of the undeveloped regions of the world and a significant obstacle to the formulation of important policies and programs in the more fully developed regions.

Generally such information on natural resources has been obtained from ground surveys. These surveys are costly, and, in the more remote and inaccessible regions of the world, they are difficult if not impossible to make.

The space age offers new, potentially powerful tools for use in the development of information gathering systems. Ways to exploit the advantages of earth-orbiting spacecraft, in addition to high flying aircraft, in acquiring many types of data need to be explored.

Areas of research include:

- (a) Identifying and describing emittance and reflectance properties of biological and physical materials through spectrophotometric analyses in the laboratory, on the ground, and from low altitudes.
- (b) Identifying the single or combined wavelengths in the electromagnetic spectrum that will yield unique and consistent imagery as it is acquired from progressively higher altitudes.
- (c) Specifying the minimum accuracy standards of data required for various agricultural and forestry applications.
- (d) Identification and analyses of economic benefits of the application of remote sensing technology to agriculture, forestry, and community planning.
- (e) Integrating remote sensing components, sampling devices, and data analysis methods into workable information gathering systems.

Exclude: (1) Research on remote sensing of fire, lightning and fire-related phenomena. (Use RPA 203).
 (2) Research on specific problem identification, such as insect infestations, and inventories and surveys. (Use appropriate RPA).

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0600 Trees, forests, and forest products (excluding edible tree nut crops (see 1050, and tung (see 2560)
- 7000 Research equipment and technology (such as remote sensing)

RPA 114. RESEARCH ON MANAGEMENT RESEARCH

The resources which would be required to effectively conduct the research on all the researchable problems confronting us greatly exceed those available. Thus, it is necessary to decide which research should be supported and the level of funding. To date there is a paucity of information available to make such decisions. Consequently, it is essential to conduct research which will lead to more reliable estimates of the benefits and costs of specific research proposals so that the objectivity of the decision-making process can be improved. Research on research management also involves such things as studies on maximizing employee and research facility productivity, and on coordination of research effort among scientists throughout the nation.

Areas of research include:

- (a) Developing criteria and techniques for evaluating research accomplishments and research proposals.
- (b) Developing methods to measure the productivity of individual scientists and of research organizations.
- (c) Exploring ways to create the kind of climate and incentives for researchers that will motivate them toward more effective research productivity.
- (d) Exploring ways to maximize the productive use of costly, specialized facilities and equipment.
- (e) Determining the needs and methods for developing, maintaining, and renewing the level of proficiency of scientists.
- (f) Examining the interrelationships between teaching and research.
- (g) Developing more effective means of communication among scientists, and between scientists and potential users of research findings.
- (h) Evaluating the roles of cooperation and competition among scientists and research organizations in striving for productivity and efficiency in the research effort of the nation as a whole.

Classification Guidelines:Activities:

- 7100 Improvement of research administration
- 7200 Information documentation and retrieval

Commodities, etc.:

- 6900 Research on research management (not research management per se)

GOAL IIPROTECT FORESTS, CROPS AND LIVESTOCK FROM INSECTS, DISEASES,
AND OTHER HAZARDS

Lower unit costs and reduced risks result from eradication or control of diseases and pests and elimination of such hazards of the environment as climatic extremes, pollution, and other stresses. Serious fluctuations in farm and forest product supplies can be avoided when these production hazards are reduced or eliminated.

RPA's 201-214, inclusive: Pages 67-81, inclusive

RPA 201. CONTROL OF INSECTS AFFECTING FORESTS

Insects exact a heavy toll of trees of all ages each year killing many, and damaging and reducing the growth of surviving trees. Wildlife habitats are changed and fire danger is increased. Water yield may be altered and recreation use of forests reduced. Forest insect research can provide the information needed to reduce the continuing losses in productivity and value of forests and forest products, including Christmas trees. A sustained flow of new information provides the basis for safe, effective methods of control.

Areas of research include:

- (a) The biosystematics, biology, ecology, physiology, pathology and genetics of forest insects and associated organisms.
- (b) Factors that predispose forest trees to insect attack.
- (c) Population dynamics of forest insects for early detection of trends and the role of biological and environmental factors affecting outbreaks.
- (d) Early detection of potentially damaging outbreaks of insect populations by remote sensing, biological sensors and other techniques.
- (e) Cultural techniques and integrated control systems to reduce insect damage.
- (f) Parasites, predators, and diseases for control of damaging insects.
- (g) Safer and more specific chemical and biotic insecticides including systemics.
- (h) Identifying and synthesizing insect attractants and repellents.
- (i) Direct and indirect control through radiation, chemical sterilization, hormonal disturbance and sound.
- (j) Equipment and methods for applying controls.
- (k) Protecting Christmas trees against insects.
- (l) Breeding and selection of trees for resistance to insects.

Exclude: (1) Research on remote sensing. (Use RPA 113).
 (2) Research on control of disease vectors. (Use RPA 202).
 (3) Research on trees to enhance the environment. (Use RPA 905).

Classification Guidelines:

Activities:

4500 Protection against insects, mites, snails, slugs and their control agents

Commodities, etc.:

0600 Trees, forests and forest products (see subcodes)

RPA 202. CONTROL OF DISEASES, PARASITES AND NEMATODES AFFECTING FORESTS

Forest disease research is essential to protect and enhance the social and economic value of trees in forests and farm woodlots. Diseases reduce the utility of trees for recreation, wildlife habitat and timber production. They kill trees, discolor foliage, retard growth and cause decay leading to breakage and windfall. Prolonged droughts, wet periods, and changing climatic conditions accentuate tree disease problems.

Areas of research include:

- (a) Taxonomy, cultural characteristics, nutritional requirements, enzyme systems, physiology and ecology of pathogens (fungi, bacteria, viruses, nematodes and mistletoes) and associated organisms in trees and in the soil in which they grow.
- (b) Epidemiology of major destructive diseases and methods of quantifying their impact on trees and forests.
- (c) Nature and action of noninfectious causes of tree diseases (climatic and weather variations, environmental stresses and nutritional imbalances).
- (d) Cultural practices which deter the spread and increase of pathogens.
- (e) Effectiveness of parasitic, predatory and antagonistic organisms for biological control of pathogens.
- (f) Physiological and biochemical bases for safe and effective biological and chemical disease control measures.
- (g) Equipment for application of spray materials.
- (h) Control of insect vectors of disease pathogens.
- (i) Protection of forest nurseries and Christmas trees against diseases.
- (j) Breeding and selection of trees for resistance to diseases.

Exclude: (1) Research on trees to enhance the environment. (Use RPA 905).

Classification Guidelines:

Activities:

4600 Protection against diseases, parasites and nematodes and their control agents.

Commodities, etc.:

0600 Trees, forests and forest products (see subcodes)

RPA 203. PREVENTION AND CONTROL OF FOREST AND RANGE FIRES

Fire research develops the knowledge for safeguarding more than one billion acres of public and private forest and range lands. Fires create air and water pollution, damage outdoor recreation, destroy natural beauty, injure natural resource-based industries, sweep rural communities and even cities, and take human lives. More than 150,000 forest fires occur annually. Development of new fire prevention methods to reduce the number of fires, new technology for fuel hazard reduction, and improved systems for fire detection and effective attack on threatening fires is needed.

Areas of research include:

- (a) Atmospheric system dynamics, patterns and characteristics.
- (b) The physics and chemistry of combustion.
- (c) The behavior of fires as influenced by fire-starting agents, atmospheric circulation and local weather, fuels and topography.
- (d) Fire intelligence systems, including electronic methods, remote sensing, automatic measurement of fire environment and computer integration of these factors into a fire danger rating system.
- (e) Prevention of lightning fires and alteration of precipitation through weather modification.
- (f) Prevent lightning fires and alter precipitation through weather modification.
- (g) Reduction of fuel hazards through physical, chemical and prescribed fire treatments.
- (h) Aerial and ground procedures for fighting fires.
- (i) Integrated fire control and forest management systems which minimize fire losses.

Classification Guidelines:

Activities:

4810 Protection against fire

Commodities, etc.:

0600 Trees, forests, and forest products (see subcodes)
0700 Range

RPA 204. CONTROL OF INSECTS, MITES, SLUGS, AND SNAILS ON FRUIT AND
VEGETABLE CROPS

Control of these pests is a major item in production costs of fruits, vegetables, and edible tree nuts. Growers currently spend large sums each year for control measures and still sustain serious losses. The problem is made more difficult by the large number of plant species involved and by the diversity among the insects attacking these species. Associated with the insect problems are insecticide residue problems.

Areas of research include:

- (a) Biological control through use of predators, parasites, diseases, male sterility techniques and chemical and physical attractants to lure insects into areas where they can be destroyed.
- (b) Breeding and selection of fruits and vegetables for resistance to insects, mites, slugs, and snails.
- (c) Studies on the genetic, nutritional and environmental factors that govern the activities of these pests.
- (d) Methods to prevent introduction of new pests from foreign sources.
- (e) Studies on the mechanisms by which these pests become resistant to chemical controls.
- (f) Search for effective, safe, non-persistent chemical controls.
- (g) Development of improved methods and equipment for applying chemical controls.

Exclude: (1) Research on control of insect vectors. (Use RPA 205).
(2) Research to alleviate soil, water, and air pollution.
(Use RPA 901).

Classification Guidelines:

Activities:

4500 Protection against insects, mites, snails, slugs and
their control agents

Commodities, etc.:

0900 Citrus and subtropical fruit (see subcodes)
1000 Deciduous and small fruits and edible tree nuts (see subcodes)
1100 Potatoes
1200 Vegetables (see subcodes)
2800 Miscellaneous and new crops (see subcodes)
6700 Plants

RPA 205. CONTROL OF DISEASES AND NEMATODES OF FRUIT AND VEGETABLE CROPS

Control of diseases of fruits, vegetables, and edible tree nuts is expensive, imperfect and sometimes extremely difficult. Growers spend large sums each year in order to achieve partial control of the fungi, bacteria, viruses, and nematodes that cause diseases. Even with these efforts, diseases reduce crop yields substantially.

Areas of research include:

- (a) Breeding and selection of fruits and vegetables for resistance to diseases.
- (b) Crop sequence and soil management in relation to soil borne diseases.
- (c) Micro-ecological studies of the soil in relation to soil borne diseases.
- (d) Non-chemical control methods, such as use of hot water, dry heat, or irradiation of seed and tissues for propagation of disease-free stock.
- (e) Crop sanitation and cultural technique studies including use of soil amendments.
- (f) Methods of detecting minute traces of disease inoculum.
- (g) Effective and less hazardous fungicides, bactericides, and nematocides.
- (h) Methods and equipment for applying soil fumigants, sprays, or dusts to soils or plants.
- (i) Control or elimination of vectors of plant disease.
- (j) Exclusion of foreign diseases.
- (k) Physiological studies of noninfectious diseases.
- (l) Epidemiological and related meteorological studies as aids to disease avoidance and control.
- (m) Environmental control to suppress disease development.
- (n) Improved methods of producing, indexing, and distributing virus-free propagating stocks.

Classification Guidelines:

Activities:

4600 Protection against diseases, parasites and nematodes and their control agents

Commodities, etc.:

0900 Citrus and subtropical fruit (see subcodes)
 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
 1100 Potatoes
 1200 Vegetables (see subcodes)
 2800 Miscellaneous and new crops (see subcodes)
 6700 Plants

RPA 206. CONTROL OF WEEDS AND OTHER HAZARDS TO FRUIT AND VEGETABLE CROPS

Control of weeds and other hazards of fruits, vegetables, and edible tree nuts is a major item in the cost of producing these crops. Other hazards include mice, birds, rabbits and other forms of wildlife, hail, frost and other climatic extremes.

Areas of research include:

- (a) Biological control of weeds.
- (b) The relationship of plant anatomy, morphology, and physiology to the absorption and translocation of herbicides.
- (c) Mechanism of action of herbicides.
- (d) Search for more effective, faster degrading and less hazardous herbicides.
- (e) Production practices to inhibit or prevent weed growth.
- (f) Improved methods and equipment for herbicide application with special attention to control of drift.
- (g) Control methods including attractants and repellents for rabbits, rodents, birds, deer, and other destructive forms of wildlife.
- (h) More effective methods of minimizing losses from factors such as frost, hail, wind and other environmental extremes.

Classification Guidelines:

Activities:

- 4700 Protection against weeds and their control agents
- 4840 Protection against climatic extremes
- 4850 Protection against birds
- 4860 Protection against rodents and other mammals

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants

RPA 207. CONTROL OF INSECTS, MITES, SNAILS AND SLUGS AFFECTING FIELD CROPS AND RANGE

Control of insects, mites, snails, and slugs adds greatly to production costs. In spite of large outlays, it is estimated that insects destroy about 10 percent of all field crops each year. It has become necessary to abandon many well established control practices because of residue and pollution problems.

Areas of research include:

- (a) Study of heritable traits and breeding and selection to improve resistance to insects, mites, snails and slugs.
- (b) Biological control of insects, etc. through use of predators.
- (c) Insect population suppression through use of techniques to induce male sterility and through use of chemical and physical attractants to lure insects into areas where they can be destroyed.
- (d) Search for more effective and safer insecticides.
- (e) Improved methods and equipment for applying insecticides.
- (f) Genetic, nutritional and environmental factors that govern the activities of insects.
- (g) Production and cultural practices that minimize losses from insects.
- (h) Studies of the mechanisms by which insects become resistant to insecticides.
- (i) Methods to prevent introduction of harmful insects from foreign sources.

Exclude: (1) Research on control of insect vectors. (Use RPA 208).
 (2) Research to alleviate soil, water and air pollution.
 (Use RPA 901).

Classification Guidelines:

Activities:

4500 Protection against insects, mites, snails and slugs
 and their control agents

Commodities, etc.:

0700 Range
 1400-2100, 2300-2800 (See Commodity Classification Table "B")
 6700 Plants

RPA 208. CONTROL OF DISEASES AND NEMATODES OF FIELD CROPS AND RANGE

Control of diseases is essential in order to provide an adequate supply of food, feed and fiber. Growers currently are spending large sums to achieve partial control of the fungi, bacteria, nematodes, and viruses that attack field, range and pasture crops. Even at this level of effort, diseases reduce yields substantially. Man is constantly challenged by newly developed races of disease organisms.

Areas of research include:

- (a) Study of heritable traits and breeding and selection of field and range crops to improve resistance to diseases.
- (b) Crop sequence and soil management in relation to soil borne diseases.
- (c) Effective and less hazardous fungicides, bactericides and nematocides.
- (d) Methods and equipment for applying soil fumigants, sprays, or dusts to soils or plants.
- (e) Micro-ecological studies of the soil in relation to soil borne diseases.
- (f) Non-chemical control methods, such as use of hot water, dry heat, or irradiation to obtain disease-free seed and tissue for propagation.
- (g) Crop sanitation and cultural technique studies.
- (h) Methods of detecting minute traces of disease inoculum.
- (i) Control or elimination of vectors of plant disease.
- (j) Exclusion of foreign diseases.
- (k) Environmental control to suppress disease development.
- (l) Epidemiological and related meteorological studies as aids to disease avoidance and control.

Exclude: (1) Research on breeding and selection of plants for reduced content of inherent toxic components. (Use RPA 405).

Classification Guidelines:

Activities:

- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4840 Protection against climatic extremes

Commodities, etc.:

- 0700 Range
- 1400-2100, 2300-2800 (See Commodity Classification Table "B")
- 6700 Plants

RPA 209. CONTROL OF WEEDS AND OTHER HAZARDS OF FIELD CROPS AND RANGE

Weeds and other hazards in field crops and their control adds substantially to costs per unit of production. Research is directed at ways to reduce these costs. Hazards other than weeds include birds, various animals, fire, and environmental factors.

Areas of research include:

- (a) Biological control of weeds.
- (b) Effective, less hazardous herbicides.
- (c) The relationship of plant anatomy, morphology, and physiology to the absorption and translocation of herbicides.
- (d) Mechanism of action of herbicides.
- (e) Production practices including cultivation and flaming to inhibit or prevent weed growth.
- (f) Control methods including repellants and attractants for birds, rabbits, rodents, deer and other destructive forms of wildlife.
- (g) Techniques for application of herbicides with special attention to control of drift.
- (h) More effective methods of minimizing losses from factors such as frost, hail, wind and other environmental extremes.

Classification Guidelines:

Activities:

- 4700 Protection against weeds and their control agents
- 4840 Protection against climatic extremes
- 4850 Protection against birds
- 4860 Protection against rodents and other mammals

Commodities, etc.:

- 0700 Range
- 1400-2100, 2300-2800 (See Commodity Classification Table "B")
- 6700 Plants

RPA 210. CONTROL OF INSECTS AND EXTERNAL PARASITES AFFECTING LIVESTOCK,
POULTRY, AND OTHER ANIMALS

Insects, ticks, leeches, and mites reduce animal productivity or act as vectors in the transmission of livestock and poultry diseases. Pests irritate and torment livestock throughout the year in all parts of the United States. The losses include reduced efficiency of weight gains and milk and egg production, damaged hides, and the cost and expense of applying insecticides. Methods of control have been developed, but they are less than adequate, either because of difficulty and expense or lack of effectiveness. Suppression of the screw worm by release of males made sterile by nuclear radiation is an example of successful application of recent research.

Areas of research include:

- (a) Biology and life history of the pest.
- (b) Use and development of irradiation, chemosterilants, attractants, repellants, and other non-insecticidal approaches to insect control.
- (c) Absorption, metabolism, and excretion of insecticides by insects feeding on or in animals.
- (d) Biological control of insects through use of predators.
- (e) The nature of insect resistance to chemical controls.
- (f) Evaluation of alternative control methods.
- (g) Development of methods and equipment for applying or using control materials.

Exclude: (1) Research on control of insect vectors of disease.
(Use RPA 211).
(2) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

4500 Protection against insects, mites, snails and slugs
and their control agents

Commodities, etc.:

2900 Poultry (see subcodes)
3000 Beef cattle
3100 Dairy cattle (see subcodes)
3200 Swine
3300 Sheep and wool
3400 Other animals (see subcodes)
6800 Animals (Vertebrates)

RPA 211. CONTROL OF DISEASES OF LIVESTOCK, POULTRY AND OTHER ANIMALS

Diseases represent a major hazard to the production of an adequate and wholesome supply of animal products. They are a constant threat to the economic welfare of the livestock or poultry producer. Losses result from mortality, reduced productivity, cost of treatment or immunization, cost of regulatory programs, and condemnation of meat at the slaughter-house.

Areas of research include:

- (a) The nature of the causative agents involved in animal diseases.
- (b) Mechanisms of disease resistance and immunity.
- (c) The interrelationship of environment, genetics, and infectious agents in the etiology of diseases.
- (d) Methods of diagnosis, prevention, treatment, control, and eradication of diseases. Include development of equipment.
- (e) Methods of keeping infectious diseases, such as foot-and-mouth disease and rinderpest, out of this country.
- (f) Evaluation of alternative control methods.
- (g) Development of information on disease transmission by insects and other ectoparasites.
- (h) Breeding and selection for disease resistance.
- (i) Control of insect vectors of disease.

- Exclude:
- (1) Research on disorders due to improper nutrition.
(Use RPA 311).
 - (2) Research on disorders resulting from pollution.
(Use RPA 214).
 - (3) Research on bloat and disorders due to ingestion of toxic plants, etc. (Use RPA 213).
 - (4) Research on environmental stress. (Use RPA 312).
 - (5) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 4600 Protection against diseases, parasites and nematodes and their control agents

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 212. CONTROL OF INTERNAL PARASITES OF LIVESTOCK, POULTRY, AND OTHER ANIMALS

Parasites, such as various kinds of worms, flukes, and coccidia cause losses in all parts of the country and in all seasons. Severe infestations of parasites may cause heavy direct losses to the livestock producer. Losses include mortality, reduced yield, condemnation of meat, feed wastage, and cost of drugs. Available treatments or control measures are still inadequate even for the parasites that have been the subject of considerable research.

Areas of research include:

- (a) Biotic relationships in parasitism.
- (b) Control by biological methods and management practices that minimize reliance on chemicals.
- (c) Safe chemical means including systemics for combating parasites.
- (d) Effective means of diagnosing parasitic infestation.
- (e) Evaluation and development control methods and equipment.
- (f) Study of heritable traits and breeding and selection to improve resistance to parasites.

Exclude: (1) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).
 (2) Research on insects, ticks, leeches and mites. (Use RPA 210).

Classification Guidelines:

Activities:

4600 Protection against diseases, parasites and nematodes and their control agents

Commodities, etc.:

2900 Poultry (see subcodes)
 3000 Beef cattle
 3100 Dairy cattle (see subcodes)
 3200 Swine
 3300 Sheep and wool
 3400 Other animals (see subcodes)
 6800 Animals (Vertebrates)

RPA 213. PROTECT LIVESTOCK, POULTRY AND OTHER ANIMALS FROM TOXIC CHEMICALS, POISONOUS PLANTS, AND OTHER HAZARDS

Livestock and poultry may suffer losses in productivity from toxic chemicals, pesticides, poisonous plants, predators, ingestion of metal and other foreign bodies, and other hazards. Poisonous plants can cause heavy losses, particularly when pasture or range feed supplies are short or at seasons of the year when these plants are not discriminated against by the grazing animal. Predators cause heavy damage to sheep and turkeys. Bloat is a serious problem among ruminants.

Areas of research include:

- (a) Determining the specific sites and mechanisms of poisoning, bloat and other disorders in order to learn the bases of these phenomena.
- (b) The toxicology and safe levels of residues of pesticides and other chemicals, natural or synthetic, used directly on or ingested by livestock and poultry.
- (c) Methods of reducing the ingestion of pesticides or other chemicals in or on animal feeds.
- (d) The specific reasons for inter-species differences in detoxication mechanisms and sensitivity to poisoning by pesticides and other chemicals.
- (e) Developing animal management practices that minimize the use of pesticides and other chemicals that leave toxic residues or that reduce the level of such residues.
- (f) Prevention or alleviation of "hardware disease," and the effects of plants that cause bloat, poisoning, or deformities of livestock.
- (g) Developing methods for combating nuclear radiation hazards to livestock.
- (h) Methods for reducing animal losses from predators.
- (i) Developing necessary equipment.

- Exclude:
- (1) Breeding and selection of feed crops for reduced content of toxic components. (Use RPA 405).
 - (2) Research on pesticides applied to or ingested by livestock and poultry when the emphasis is clearly on reduction of the toxic content of foods. (Use RPA 701).
 - (3) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4700 Protection against weeds and their control agents
- 4860 Protection against rodents and other mammals
- 4880 Protection against allergens, toxins and poisonous plants
- 4890 Protection against radiation, noise and other hazards

RPA 213. (Continued)

Commodities, etc.:

~~2900~~ Poultry (see subcodes)
3000 Beef cattle
3100 Dairy cattle (see subcodes)
3200 Swine
3300 Sheep and wool
3400 Other animals (see subcodes)
6800 Animals (Vertebrates)

RPA 214. PROTECTION OF PLANTS, ANIMALS, AND MAN FROM HARMFUL EFFECTS OF POLLUTION

Pesticides, salts, sewage, cannery, textile, and animal wastes are generally considered objectionable when they occur as pollutants. Under some conditions they may be detrimental or cause effects detrimental to specific plants or animals.

Air pollutants such as sulfur dioxide, ethylene, and fluorides have long been recognized as harmful to vegetation. Recently, increasing importance has been attached to photochemical air pollution. Examples of plant damage are: fluoride damage to corn, citrus, trees, and flowers; ethylene damage to cotton and orchids; and ozone damage to cotton, grapes, tobacco, and trees.

Fluorides cause a serious malady in cattle known as fluorosis. Laboratory experiments with animals show that certain irritants common in polluted air can increase susceptibility to respiratory infection and increase mortality.

The pollutants which affect plants and animals may also affect man. Smog may cause eye irritation and increase the severity of respiratory ailments. Air borne allergens, such as pollens, cause suffering to those susceptible to them.

Areas of research include:

- (a) Sources and concentrations of damaging pollutants and the intensity and frequency of occurrence of damage.
- (b) Methodology and instrumentation for detection of pollutants and methods of analysis.
- (c) Tolerance of plants, animals, man and insects to pollutants, singly and in combinations, especially to low-level pollution for prolonged periods of time.
- (d) Methods and equipment for protecting plants, animals, and man from pollutants.
- (e) Breeding and selection of plants and animals resistant to pollution.

Exclude: (1) Research on noise. (Use RPA 312).
 (2) Research on trees to enhance rural and urban environment.
 (Use RPA 905).
 (3) Research on alleviation of pollution. (Use RPA 901).

Classification Guidelines:

Activities:

4830 Protection against pollutants
 7500 Development of research equipment and technology

Commodities, etc.:

0500-1200, 1400-2100, 2300-3400, 4000, 7000
 (See Commodity Classification Table "B")
 6700 Plants

GOAL IIIPRODUCE AN ADEQUATE SUPPLY OF FARM AND FOREST PRODUCTS AT DECREASING
REAL PRODUCTION COSTS

Food and fiber supplies must be increased about 40 percent in order to meet domestic needs 32 percent higher and an export goal 100 percent higher in 1980 than now. For the year 2000, these supplies must be increased 111 percent to meet 75 percent higher domestic needs and a 200 percent higher export goal. Domestic needs for forest products will be up an estimated 80 percent by 2000. Consumption of farm and forest products can be increased and their competitive position in domestic and foreign markets improved by reducing production costs. Of particular concern are those farm products which are under pressure from synthetics and imports.

RPA's 301-318, inclusive: Pages 83-102, inclusive .

RPA 301. GENETICS AND BREEDING OF FOREST TREES

Forest practice today is based largely on unimproved forest trees. Unlike crop plants, trees have not undergone centuries of controlled selection and breeding to make them more useful to man. There is strong evidence that through application of genetic principles we can produce tree varieties that grow faster, resist most major destructive pests, have specified wood properties, or yield more sap or gum. It should be feasible to develop straighter form, fewer limbs and resistance to insects, diseases and climatic extremes. Quality and yield of timber-related crops such as naval stores, maple sap and Christmas trees can be improved through application of research findings.

Areas of research include:

- (a) Reproductive processes to induce early flowering and seed production.
- (b) Individual and geographic variation within important tree species.
- (c) Genetic and breeding methods including the induction of mutations to improve forest species through breeding.
- (d) Selection and breeding of trees that are superior for the production of high quality timber and timber-related products.

Exclude: (1) Research on ornamentals. (Use RPA 906).
 (2) Research on shade trees. (B-0615, 0624, and 0625).
 (Use RPA 905).
 (3) Research on management practices. (Use RPA 111).
 (4) Breeding and selection of trees for insect resistance. (Use RPA 201)
 (5) Breeding and selection of trees for disease resistance.
 (Use RPA 202).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs
 and their control agents
- 4600 Protection against diseases, parasites and nematodes
 and their control agents
- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals
- 5100 Increasing acceptability of farm and forest products

Commodities, etc.:

- 0600 Trees, forests, and forest products (see subcodes)

RPA 302. NEW AND IMPROVED FOREST ENGINEERING SYSTEMS

Improved forest engineering systems can reduce timber harvesting costs, increase and stabilize rural payrolls, reduce accidents and provide higher returns to industry. Over 100 billion board feet of timber in Alaska and the western states are inaccessible due to the high cost of road construction, steep terrain, soil conditions, and lack of equipment suitable for timber harvesting. In other States, because of the high proportion of small-size timber and the high percentage of defective timber, the economic feasibility of harvesting is limited.

Areas of research include:

- (a) Harvesting systems for difficult access terrain.
- (b) Low-cost bulk transport of wood chips.
- (c) Harvesting systems for low-quality timber in areas such as Appalachia and the Lake States.
- (d) Mechanization of production of specialized timber crops such as naval stores and Christmas trees.
- (e) Mechanized systems for regeneration of timber.
- (f) Design of equipment for safe handling of timber and other forest products.

Exclude: (1) Research on design of watershed structures and runoff control systems. (Use RPA 107).
 (2) Research management systems, and special equipment, and facilities which will minimize dangers of fire, avalanches, and other natural hazards in outdoor recreation areas. (Use RPA 902).

Classification Guidelines:

Activities:

- 5200 Mechanization, improvement of physical efficiency, and development of structures and facilities
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0300 Water and Watersheds
- 0600 Trees, forests and forest products (see subcodes)
- 7000 Research equipment and technology

RPA 303. ECONOMICS OF TIMBER PRODUCTION

Timber production efficiency research investigates how income can be increased through effective use of labor and capital. Such information is generally lacking for the wide variety of forestry investments possible in different areas. Returns of expenditures for planting, stand improvement, and other timber growing activities vary widely throughout the nation and depend on many cost factors including the quantity and quality of timber yields, and local market conditions. Identifying the most profitable opportunities for management of public forestry programs and for private investments on forest lands is basic to efficient allocation of the funds available for timber growing.

Areas of research include:

- (a) Evaluation of opportunities for profitable timber growing in relation to different combinations of forest types, site, types of ownership, size of holdings and market factors.
- (b) Potential returns from investments in different areas in forest protection, road construction, planting, thinning, and other forestry measures.
- (c) Capital requirements for development of public and private forestry operations.
- (d) Effects of income and local taxation on economics of timber production.
- (e) Determine the most efficient combinations of practices for public and private timber production including the effects of public programs and policies.
- (f) Economics of timber production, small ownerships including private institutional arrangements affecting management.

Exclude: (1) Research on evaluation of public assistance programs.
(Use RPA 903).

Classification Guidelines:

Activities:

- 5300 Management of labor, capital and other inputs
- 6000 Analysis of supply, demand and price, including
interregional competition
- 6500 Description, inventory and trends
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0600 Trees, forests, and forest products (see subcodes)

RPA 304. IMPROVEMENT OF BIOLOGICAL EFFICIENCY OF FRUIT AND VEGETABLE CROPS

Fruits, vegetables, and edible tree nuts are generally produced on high-value land and involve high capital and labor inputs. It is essential that biological efficiency be optimized in order that cost per unit of production be held down and the needs of the American consumer be met at a reasonable cost. The potential for developing an export market is largely dependent on the competitive price relationship of the crops.

Areas of research include:

- (a) The genetic and physiological mechanisms and processes affecting biological efficiency.
- (b) Search for germplasm to maintain or improve biological efficiency.
- (c) Developing more effective breeding procedures for fruit and vegetable crops.
- (d) Developing improved varieties and strains which possess desired levels of biological efficiency along with other desirable attributes.
- (e) Developing better procedures for distributing desirable germplasm--either as seed or other propagating materials.
- (f) Improving the management and culture of fruits and vegetables including research on cultural practice such as fertilization, plant spacing and population, time of seeding, soil preparation, and water or soil moisture management when the primary orientation is directed to the fruit or vegetable response to the environmental variable (fertilizer, water, soil, spacing, etc.).
- (g) Engineering work on instrumentation and equipment for studying the effects of environmental factors on growth and health of crops.

- Exclude:
- (1) Breeding and selection for resistance to diseases.
(Use RPA 205).
 - (2) Breeding and selection for resistance to insects.
(Use RPA 204).
 - (3) Breeding and selection for resistance to drought and excessive moisture. (Use RPA 105).
 - (4) Breeding and selection, and management for quality.
(Use RPA 402).
 - (5) Research on plants or cropping sequences to manage or improve saline soils. (Use RPA 103).
 - (6) Engineering development of commercial scale machinery for control of plant environment. (Use RPA 305).
 - (7) Research on the interrelationship among soil properties, fertilizers, water, and plants when the primary emphasis is toward these interrelationships and not production of a particular crop, e.g. tomatoes. (Use RPA 102).
 - (8) Breeding and selection of varieties adapted to mechanization of production. (Use RPA 305).

RPA 304. (Continued)

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals
- 7500 Development of research equipment and technology

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants
- 7000 Research equipment and technology

RPA 305. MECHANIZATION OF FRUIT AND VEGETABLE CROP PRODUCTION

An overriding consideration in mechanization of fruit, vegetable, and edible tree nut production is the requirement for timeliness in accomplishing the various operations from planting through harvesting and handling the harvested crop because of perishability of the product. Mechanization is needed to increase efficiency and decrease labor requirements in the production of fruit and vegetable crops. Mechanization in fruit and vegetable production is less extensive than that in field crops.

Areas of research include:

- (a) Developing principles relative to mechanical and rheological properties of fruits and vegetables as they affect handling operations.
- (b) Developing machines and improved machine components to plant, cultivate, harvest, and handle specific crops.
- (c) Developing precision devices, such as for planting operations.
- (d) Developing tillage units to minimize power requirements, number of operations, and to provide the optimum seed bed conditions.
- (e) Automating machine operations.
- (f) Breeding and selection of varieties adapted to mechanization of production.
- (g) Developing prototype machinery and equipment for control of plant environment.

- Exclude:
- (1) Engineering work on instrumentation for studying the effects of environmental factors on growth and health of crops. (Use RPA 304).
 - (2) Development of specialized equipment for protection against insects, diseases, weeds, and other hazards. (Use RPA 204, 205, 206, or 214).

Classification Guidelines:

Activities:

- 5200 Mechanization and improvement of physical efficiency, and development of structures and facilities

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants

RPA 306. PRODUCTION MANAGEMENT SYSTEMS FOR FRUITS AND VEGETABLES

Many of the management studies applied to the production of fruits, vegetables, and edible tree nuts in the past have dealt with such economic questions as the most profitable rate of fertilization, comparative net returns from various crops, the economy of hand vs. machine methods, and the relative costs of different machine sizes. Available methods of analysis severely limited the number of alternatives that could be compared. High-speed electronic computers and new analytical models have opened the way to more comprehensive analyses of alternatives. These new analytical tools provide a useful technique to the horticulturist and the engineer in devising or selecting the most effective production system. The joint efforts of the horticulturist, the engineer and the economist will enable them to select the "best" production plan. This plan is made up of a "bundle" or compatible set of choices among alternative crops, production practices, and equipment.

Management systems analysis will include consideration and integration of choices within each of the following:

- (a) Crops, crop sequences, and crop varieties;
and
- (b) Plant population, moisture management methods, fertilizer and pesticide rates, and time and method of application;
and
- (c) Time and labor for performing each operation most effectively;
and
- (d) Timeliness of operations permitted by alternative types and sizes of equipment, as well as their relative costs.

Classification Guidelines:

Activities:

- 5200 Mechanization, improvement of physical efficiency, and development of structures and facilities
- 5300 Management of labor, capital and other inputs

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants

RPA 307. IMPROVEMENT OF BIOLOGICAL EFFICIENCY OF FIELD CROPS

Research to maintain or improve the biological efficiency of field crops is of paramount importance in determining the ability of agriculture to meet the feed, food, and fiber needs of the American people and provide vital amounts of these commodities for export.

Increased biological efficiency can provide, the food and fiber needs of an expanding population. Efficient field crop production is basic to an efficient, economic livestock industry.

Areas of research include:

- (a) The genetic and biological determinants of biological efficiency.
- (b) Identification of superior germplasm and breeding and selection of improved varieties.
- (c) Cultural practices including fertilization, plant spacing and population, time of seeding, soil preparation, and water or soil moisture management when the primary orientation is directed to the specific crop, e.g. corn, response to the environmental variable (fertilizer, water, soil, spacing, etc.).
- (d) Procedures for multiplication and distribution of superior germplasm (seed or other propagating material).
- (e) Methods of adaptation to critical environmental factors including engineering work on instrumentation for studying the effects of environmental factors on growth and health of crops.

- Exclude:
- (1) Breeding and management related to quality improvement. (Use RPA 405).
 - (2) Research to produce feed crops with a reduced content of toxic components. (Use RPA 405).
 - (3) Breeding and selection of field crops for disease resistance. (Use RPA 208).
 - (4) Breeding and selection of field crops for resistance to insects. (Use RPA 207).
 - (5) Breeding and selection of field crops for drought resistance. (Use RPA 105).
 - (6) Breeding and selection of field crops for tolerance to salinity and research on plants or cropping sequences to manage or improve saline soils. (Use RPA 103).
 - (7) Breeding and selection of range forage plants. (Use RPA 112).
 - (8) Development of machinery and equipment for control of plant environment suitable for commercial adaptation. (Use RPA 308).
 - (9) Research on the interrelationship among soil properties, fertilizers, water, and plants when the primary emphasis is toward these interrelationships and not production of a particular crop, e.g. corn. (Use RPA 102).
 - (10) Breeding and selection of varieties adapted to mechanization of production. (Use RPA 308).

RPA 307. (Continued)

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals

Commodities, etc.:

- 1400 Corn
- 1500 Grain sorghum
- 1600 Rice
- 1700 Wheat (see subcodes)
- 1800 Other small grain (see subcodes)
- 1900 Pasture
- 2000 Forage crops (see subcodes)
- 2100 Cotton (see subcodes)
- 2300 Soybeans
- 2400 Peanuts
- 2500 Other oilseed crops (see subcodes)
- 2600 Tobacco (see subcodes)
- 2700 Sugar crops (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants

RPA 308. MECHANIZATION OF PRODUCTION OF FIELD CROPS

Mechanization research is needed to increase efficiency and decrease labor requirements in the production of field crops. An important consideration in field crop production is the requirement for timeliness in accomplishing certain operations from planting through harvesting and handling the harvested crop. Mechanization in the production of field crops has increased substantially in recent years. A large increase in crop production has been accompanied by a significant decrease in man-hours of labor used. Opportunities for further improvements in mechanization are promising.

Areas of research include:

- (a) Improving machine components and developing machines to plant, cultivate, harvest, and handle specific crops.
- (b) Developing precision devices and automated systems of machine operations.
- (c) Developing tillage units to minimize power requirements, number of operations, and to provide optimum seed bed conditions.
- (d) Determining mechanical and rheological properties of crop products to facilitate development of equipment and procedures of handling.
- (e) Breeding and selection of varieties and cultural practices to provide plants adapted to mechanized operations.
- (f) Engineering development of prototype machinery and equipment for control of plant environment.

Exclude: (1) Engineering work on instrumentation for studying the effects of environmental factors on growth and health of crops
(Use RPA 307).
(2) Development of specialized equipment for protection against insects, diseases, weeds, and other hazards.
(Use RPA 207, 208, 209, or 214).

Classification Guidelines:

Activities:

5200 Mechanization, improvement of physical efficiency, and development of structures and facilities

Commodities, etc.:

1400 Corn	2200 Cottonseed (for meal, oil, etc.)
1500 Grain sorghum	2300 Soybeans
1600 Rice	2400 Peanuts
1700 Wheat (see subcodes)	2500 Other oilseed crops (see subcodes)
1800 Other small grains (see subcodes)	2600 Tobacco (see subcodes)
1900 Pasture	2700 Sugar (see subcodes)
2000 Forage crops (see subcodes)	2800 Miscellaneous and new crops
2100 Cotton (see subcodes)	6700 Plants

RPA 309. PRODUCTION MANAGEMENT SYSTEMS FOR FIELD CROPS

Farm operators must often choose among a number of crops and crop sequences, as well as methods or "systems" to be used in the production of each crop. Much of the economic analysis applied to the production of field crops in the past has dealt with such questions as the economy of hand vs. machine methods, relative costs of different machine sizes, the most profitable rate of fertilization, or the comparative net returns from various crops. Lack of data and available methods of analysis severely limited the number of alternatives that could be compared.

Many new analytical tools provide a useful technique to the agronomist and the engineer in devising or selecting the most effective production system. The joint effort of the agronomist, the engineer and the economist will enable them to select the "best" production plan. The plan is made up of a "bundle" or compatible set of choices among alternative crops, production practices and equipment.

Management systems analysis will include consideration and integration of choices within each of the following:

- (a) Crops, crop sequences, and crop varieties;
and
- (b) Fertilizer and pesticide rates, and time and methods of application, plant population, and moisture management;
and
- (c) Time and labor available for performing each operation most effectively;
and
- (d) Timeliness of operations permitted by alternative types and sizes of equipment, as well as their relative costs.

Classification Guidelines:

Activities:

- 5200 Mechanization, improvement of physical efficiency, and development of structures and facilities
- 5300 Management of labor, capital and other inputs

Commodities, etc.:

- | | |
|--|---|
| 1400 Corn | 2500 Other oilseed crops
(see subcodes) |
| 1500 Grain sorghum | 2600 Tobacco (see subcodes) |
| 1600 Rice | 2700 Sugar crops (see sub-
codes) |
| 1700 Wheat (see subcodes) | 2800 Miscellaneous and
new crops
(see subcodes) |
| 1800 Other small grains (see subcodes) | 6700 Plants |
| 1900 Pasture | |
| 2000 Forage crops (see subcodes) | |
| 2100 Cotton (see subcodes) | |
| 2300 Soybeans | |
| 2400 Peanuts | |

RPA 310. REPRODUCTIVE PERFORMANCE OF LIVESTOCK, POULTRY AND OTHER ANIMALS

Brood animals fail to come in heat, fail to conceive, abort with embryonic deaths, have stillbirths or lose their offspring in postnatal deaths. Poultrymen have no way of ensuring that all eggs incubated are fertile, nor of hatching all those which are fertile. Attainment of optimum reproductive efficiency could greatly decrease the cost of producing calves, pigs, lambs, chicks, and poults, and other young.

Areas of research include:

- (a) Reduce the age of first breeding in females.
- (b) Improve libido and reduce physical and psychological barriers to mating.
- (c) Develop methods to control estrus.
- (d) Improve semen metabolism and preservation, and artificial insemination technique.
- (e) Determine the effects of stress factors on reproductive performance.
- (f) Control sex of offspring through sperm separation and other means.
- (g) Increase the fertilization and conception rate of available ova.
- (h) Increase the number of potentially fertilizable ova, particularly for sheep and cattle.
- (i) Reduce prenatal, natal, and postnatal mortality.
- (j) Determine the effect of herd management systems, such as time of calving and interval between calves, on reproductive performance.
- (k) Develop and improve methods for storing, transplanting, fertilizing and growing ova in vitro and in vivo.
- (l) Improve mothering ability.
- (m) Conduct genetic studies to improve reproductive performance.
- (n) Develop practical methods for early diagnosis of pregnancy.

Exclude: (1) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Acceptable Classifications:

Activities:

- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 311. IMPROVEMENT OF BIOLOGICAL EFFICIENCY IN PRODUCTION OF LIVESTOCK,
POULTRY AND OTHER ANIMALS

In the last 20 years broiler feed efficiency increased 40 percent, and further gains are possible. Similar gains in feed efficiency have not been made in the other classes of livestock. Attainment of greater productive efficiency requires employment of genetic, nutrition, and physiology research.

Areas of research include:

- (a) Digestion and metabolism
- (b) Nutrient requirements for specific life processes and longevity.
- (c) Hormonal and nutritional interactions for maintenance and growth.
- (d) Genetic studies designed to evaluate the importance of heredity in the production of animal products, e.g. heritability, genetic correlations, methods of selection, mating systems.
- (e) Breeding and selection of improved strains.
- (f) Composition and biological availability of nutrients.
- (g) Effects of processing and feeding system variables on nutritive values of feed.
- (h) Alternate sources of nutrients, including forages.
- (i) Management of breeding stocks.

- Exclude:
- (1) Research on reproductive performance. (Use RPA 310).
 - (2) Research on environmental stress. (Use RPA 312).
 - (3) Research on reduction of waste carcass fat and proportion of low meat yield cuts. (Use RPA 409).
 - (4) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 312. ENVIRONMENTAL STRESS IN PRODUCTION OF LIVESTOCK, POULTRY AND OTHER ANIMALS

In spite of a heavy investment in farm buildings for livestock, stresses from the effects of climate, handling, and other environmental factors decrease productivity substantially. Extremes in temperature, humidity, air movement, and noise may lead to poor feed efficiency, throw animals off feed, reduce resistance to disease, and even cause death losses.

Areas of research include:

- (a) Environmental factors which reduce productivity.
- (b) Genetic adaptability to extreme environments and breeding and selection for tolerance.
- (c) Facilities and equipment that reduce environmental stresses.
- (d) Management systems that enable animals to adapt to stress conditions.
- (e) Physiological and behavioral responses of animals to various environmental conditions.

Exclude: (1) Research on effects of stress factors on reproductive performance. (Use RPA 310).
 (2) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 4840 Protection against climatic extremes
- 4890 Protection against radiation, noise and other hazards
- 4900 Biology of plants and animals
- 5000 Improving biological efficiency of plants and animals

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 313. PRODUCTION MANAGEMENT SYSTEMS FOR LIVESTOCK, POULTRY AND OTHER ANIMALS

Animal producers are faced with a wide variety of production alternatives. Lack of data and limitations of available methods of analysis have severely limited the number of alternatives that could be adequately evaluated. High speed electronic computers and newer analytical methods and models have opened the way to more comprehensive analyses of alternatives. The joint efforts of the scientist, the engineer and the economist will enable them to select the "best" production plan. The plan is made up of a "bundle" or compatible set of choices among alternative production practices and equipment.

These new analytical tools provide a useful technique to the scientist and the engineer in devising or selecting the most effective production system.

Management systems analysis will include consideration and integration of choices within each of the following:

- (a) Production or purchase of a particular feed;
and
- (b) Stocking rates, grazing systems, breeding systems and other practices;
and
- (c) Kinds of livestock, breeds and strains;
and
- (d) Labor versus mechanization alternatives.

Exclude: (1) Research on fish, shellfish, game and fur-bearing animals and other animals (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 5200 Mechanization, improvement of physical efficiency,
and development of structures and facilities
- 5300 Management of labor, capital and other inputs

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 314. BEES AND OTHER POLLINATING INSECTS

Pollinating insects and honey represent a small but highly significant segment of the agricultural economy. Sale of honey, beeswax, package bees, and queens, and rental of colonies to seed producers are important items of farm income. The value of pollinators is very great. There are at least 50 agricultural crops that would fail to produce a commercial crop of fruit or seed if pollinating insects were not present to insure pollination. All research on bees and other pollinating insects is included under this RPA.

Areas of research include:

- (a) Nutritional substitutes to maintain strong colonies.
- (b) Strains of honey bees for maximum efficiency in the pollination of different crops.
- (c) Strains resistant to American and European foulbrood, nosema and other diseases.
- (d) Nonswarming strains.
- (e) Improved systems of extracting, filtering, and packaging honey.
- (f) Improved methods of protecting combs from wax moths.
- (g) Diagnostic techniques to identify the kinds of plants from which the honey was produced.
- (h) New and improved food products containing honey.
- (i) Methods of protecting bees from the harmful effects of pesticides.
- (j) Evaluation of the medicinal and therapeutic value of honey and of bee stings.
- (k) Identification, assessment of the value, and studies to improve other pollinating insects through selection, breeding and management.
- (l) Improved equipment and methods for reducing labor in handling and transporting bee colonies.
- (m) Relevant marketing activities.

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4810-6300 (See Activity List - Table "A")

Commodities, etc.:

- 3500 Bees and honey and other pollinating insects

RPA 315. IMPROVEMENT OF STRUCTURES, FACILITIES, AND GENERAL PURPOSE
FARM SUPPLIES AND EQUIPMENT

Research on farm supplies, equipment and buildings is needed to lower production costs in agriculture and prices paid by farmers for purchased production inputs. Since the early 1950's, prices received by farmers for their products have shown a generally downward trend, while prices paid for production inputs have continued to increase. Moreover, purchased inputs made up an increasing proportion of total inputs used in farm production.

Areas of research include:

- (a) Physical, chemical and biological aspects of the production of fertilizers, pesticides, feed constituents and hormones.
- (b) Engineering aspects of design and development of structures, building materials and facilities.
- (c) Engineering aspects of the design and development of general purpose machinery, equipment and tools for production, materials handling, and warehousing of farm production inputs.
- (d) The physical, chemical and biological behavior, including effects on containers, machinery, and buildings of farm inputs in production and market channels.
- (e) Studies on the properties of materials.

Exclude: (1) Research related to safe handling and use of materials and equipment. (Use RPA 709).

Classification Guidelines:

Activities:

5200 Mechanization, improvement of physical efficiency,
and development of structures and facilities

5600 Chemical and physical properties of non-food products

Commodities, etc.:

3600 General purpose supplies

3900 Structures and facilities (see subcodes)

6700 Plants

6800 Animals (Vertebrates)

RPA 316. FARM BUSINESS MANAGEMENT

Farm business management research is needed to help farm operators adjust to technological, economic, institutional, and social changes which occur continuously. Purchased inputs are increasingly being substituted for scarcer and more costly labor and land in production. New technology changes the competitive position of alternative production methods. New ways of doing business with suppliers and marketing firms require new types of decisions of the farm operator, and open up new sources of financing to him. Changing market demands require adjustments in the type of product produced.

Areas of research include:

- (a) Size and enterprise combination of the farm business (what and how much to produce).
- (b) Relative advantages of alternatives, such as purchasing or renting land and individual or joint ownership of machinery vs. hiring custom machines.
- (c) Sound financial management in the use of credit, what insurance to carry, the maintenance of nonfarm financial reserves, and the use of vertical coordination arrangements.
- (d) Analyses of where, how, and when to sell farm products and buy production inputs.
- (e) Analysis of managerial ability as it relates to the quality of decision making and the efficiency of the farm operation.
- (f) Impact of public policy and regulation on farm business management.

Classification Guidelines:

Activities:

- 5300 Management of labor, capital and other inputs
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 4200 The farm as a business enterprise

RPA 317. MECHANIZATION AND STRUCTURES USED IN PRODUCTION OF LIVESTOCK,
POULTRY AND OTHER ANIMALS

Many new mechanization problems and opportunities have arisen as a result of increasing numbers of animals in a single enterprise coupled with the decreasing availability of labor. There is need and justification to devise ways to reduce drudgery and manual effort in animal production. Such problems include the handling of feed and forage, milk, and wastes.

Research is needed not only for beef, sheep, dairy, swine, and poultry but also for pets, laboratory animals, goats, and horses.

Areas of research include:

- (a) Methods, facilities, and equipment for farm handling, processing and storing inputs such as feeds, forage and bedding.
- (b) Methods, facilities, and equipment for animal waste collection and removal from barns and feedlots.
- (c) Milking and milk handling methods.
- (d) Equipment, structures, facilities and methods for housing and handling animals.
- (e) Egg collection and handling.

Exclude: (1) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).
 (2) Research on waste disposal, including possible salvage. (Use RPA 901).
 (3) Development of specialized equipment for protection against insects, internal and external parasites, diseases, and other hazards. (Use RPA 210, 211, 212, 213, or 214).

Classification Guidelines:

Activities:

5200 Mechanization, improvement of physical efficiency, and development of structures and facilities

Commodities, etc.:

2900 Poultry (see subcodes)
 3000 Beef cattle
 3100 Dairy cattle (see subcodes)
 3200 Swine
 3300 Sheep and wool
 3400 Other animals (see subcodes)
 3600 General purpose supplies
 3900 Structures and facilities (see subcodes)
 6800 Animal (Vertebrates)

RPA 318. NON-COMMODITY-ORIENTED BIOLOGICAL TECHNOLOGY AND BIOMETRY

The better understanding of cell systems, experimental design, and other improvements in general science technology make a significant contribution to other, more specific, research on individual plants and animals.

While such research may use one of the commodities as an experimental tool, it is not commodity oriented.

Research on experimental designs and statistical analyses; purification of RNA and DNA and of structures such as ribosomes, mitochondria, and endoplasmic reticula; and metabolic pathways and biochemical reactions involved in energy transfer, growth, synthesis, and breakdown of organic compounds are examples.

Areas of research include:

- (a) Design of experiments and statistical analysis of data.
- (b) Pathways in plant and animal metabolism.
- (c) Genetic studies with yeast, Neurospora, mice, Drosophila, etc., solely for elucidation of genetic principles.
- (d) Whole cell biology studies of algae, bacteria, yeasts, molds, phages, viruses, protozoans.
- (e) Studies on weeds, not commodity oriented.
- (f) Seed research, not commodity oriented.
- (g) Insect, tick, and mite research, not commodity oriented.
- (h) Plant growth responses, not commodity oriented.

Exclude: (1) All research which can be identified under one or more of the other RPA's. (Use appropriate RPA).

Classification Guidelines

Activities:

- 4900 Biology of plants and animals
- 7000 Design of experiments and methods of statistical analysis
- 7500 Development of research equipment and technology

Commodities, etc.:

- 3800 Food
- 6100 Weeds*
- 6200 Seed research**
- 6300 Biological cell systems
- 6400 Experimental design and statistical methods
- 6500 Invertebrates (including insects, mites, ticks, snails, slugs, and leeches)*
- 6600 Microorganisms*
- 6700 Plants*
- 6800 Animals**
- 7000 Research equipment and technology

* Use only when the specific commodities affected cannot be identified

** Use only when the research is applicable to a broad range of commodities or the commodities which will be benefitted have not been identified.

GOAL IV

EXPAND THE DEMAND FOR FARM AND FOREST PRODUCTS BY DEVELOPING NEW
AND IMPROVED PRODUCTS AND PROCESSES AND ENHANCING PRODUCT QUALITY

Increasing domestic demand and improving markets abroad depend upon satisfying consumer preferences for high quality food, fiber, and forest products. This means tailoring products to meet consumer desires. More effort should be given to producing products with characteristics that meet consumer or processor needs and maintaining these qualities to point of use. New and improved uses and processes will result in more variety, reduced costs, and increased utilization of farm and forest products.

RPA's 401-412, inclusive: Pages 104-116, inclusive

RPA 401. NEW AND IMPROVED FOREST PRODUCTS

The objectives of forest products research are to develop (1) lower cost products with greater desirability, serviceability, and performance, and (2) greater use of low-quality timber, little-used species, and materials now remaining as waste.

There is a continuing decline in quality of available timber because of the lack of adequate replacements for the larger and better quality trees. Demand for timber products is expected to go up 80 percent by the year 2000. Research is needed to develop ways to convert more low-grade material into useful products. Where such timber is abundant it may be possible to establish new industries and enhance economic growth. Improved wood utilization also provides a profitable means for upgrading residual stands. Removal and use of low-quality timber frees space for better growing stock.

Areas of research include:

- (a) Anatomical, mechanical, physical and chemical properties of wood and its components, and performance in use.
- (b) Effects of environmental factors such as heat, light, and moisture on wood, wood products, and other forest products in use.
- (c) Relation of timber species, grades, and quality to wood properties and use.
- (d) More efficient design of wood members for structural purposes.
- (e) Better ways to use wood in panels, laminates, and assemblies.
- (f) New and improved processes for production of chemicals and other products; including those from bark and wood extractives.
- (g) Improved products and reduction of waste through development of more effective manufacturing processes such as sawing, drying, machining, pulping and assembling.
- (h) Effect of fungi and insects on wood and treatments to impart resistance.
- (i) Methods for removing moisture from wood and for stabilizing its dimensions and shape.
- (j) Methods for improving fire resistance of wood products.
- (k) New and improved products from wood resins, naval stores, and maple sap.

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4870 Protection against molds, fungi and other spoilage organisms
- 5400 Chemical and physical properties of food products (e.g. maple)
- 5500 Developing new and improved food products and processes (e.g. maple)
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 6300 Nutritional values, consumption patterns, and eating quality of foods (e.g. maple)
- 6400 Quality of family living including housing, management and use of time, money and other resources

RPA 401. (Continued)

Commodities, etc.:

- 0600 Trees, forests and forest products (see subcodes)
- 3900 Structures and facilities (see subcodes)

RPA 402. PRODUCTION OF FRUIT AND VEGETABLE CROPS WITH IMPROVED ACCEPTABILITY

When consumers buy fruits, vegetables, and edible tree nuts in the market, they look for external characteristics that appeal to them. At home they expect these products, whether fresh, frozen, or processed, to have eating qualities they like. Such qualities must be inherent in the products farmers produce. Fruits and vegetables are expected to withstand the rigors of mechanical harvesting and of shipment; have superior color, flavor, texture, nutritive value; retain good quality through processing and storage; and meet requirements for specific food purposes such as potatoes for baking, frying or chipping.

Areas of research include:

- (a) Enhancement of quality attributes desired by consumers and processors.
- (b) Discovery of the genetic, chemical, and physiological determinants of preferred attributes and the relationships among them.
- (c) Breeding and selecting new and improved varieties that have favored quality characteristics.
- (d) Development of improved production practices to achieve optimum quality of product harvested.

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5110 Increasing consumer acceptability of farm and forest products
- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 6700 Plants

RPA 403. NEW AND IMPROVED FRUIT AND VEGETABLE PRODUCTS AND BY-PRODUCTS

Product development and processing research can provide better fruit, vegetable, and edible tree nut products. Product research can make available new and more attractive products tailored to the requirements of specific domestic markets.

New food products may reduce preparation time and effort and may reduce costs to the consumer. New food products and methods of processing can achieve economies in storage and transportation.

Areas of research include:

- (a) Identification of the chemical constituents of each product that determine its color, flavor, texture, and nutritive value.
- (b) Techniques for stabilization through freezing, sterilization, dehydration, or combinations of these.
- (c) Fortification to increase the nutritional value of foods.
- (d) Development of new or improved products and improved processing techniques to maintain or improve the stability and nutritional value of foods.
- (e) Chemical and biochemical reactions which occur among the constituents of the product and the factors which determine their rates of reaction.

Exclude: (1) Research on product development for foreign markets.
(Use RPA 604).

Classification Guidelines:

Activities:

- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 5800 Identification, measurement and maintenance of quality
- 6400 Quality of family living, including housing, management and use of time, money and other resources

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 3800 Food (not readily associated with specific fruits and vegetables)
- 6700 Plants

RPA 404. QUALITY MAINTENANCE IN STORING AND MARKETING FRUITS AND VEGETABLES

Many of the desirable quality characteristics that fruits, vegetables, and edible tree nuts possess when they leave the farm may be lost by the time they are purchased by the consumer. Inroads of molds and other microorganisms, insects, moisture, and unfavorable temperatures, result in quality deterioration and also make a portion of the produce unsalable. Some of the serious losses in end use quality occur as a result of chemical, physical and physiological changes during transportation and storage. Prevention of such losses will give consumers a more attractive product and will eliminate the costs involved in discarding unsalable merchandise. Maintenance of quality in storage and distribution, whether on or off the farm, is included.

Areas of research include:

- (a) Characterization of the biochemical reactions that occur after harvest and determination of the enzyme systems involved.
- (b) Search for effective ways to reduce physiological deterioration and losses due to microorganisms and insects in market channels.
- (c) Investigation of the effects and means of controlling temperature, humidity, and other atmospheric variables in storage and transportation.
- (d) Systems of storage and handling conducive to the development or retention of desired color, flavor, texture and nutritive value.
- (e) Packaging and other types of protection needed to maintain conditions necessary to maintain or develop quality.

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4870 Protection against molds, fungi and other spoilage organisms
- 5400 Chemical and physical properties of food products
- 5600 Chemical and physical properties of non-food products
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 0900 Citrus and subtropical fruit (see subcodes)
- 1000 Deciduous and small fruits and edible tree nuts (see subcodes)
- 1100 Potatoes
- 1200 Vegetables (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 3800 Food (not readily associated with specific fruits and vegetables)
- 6700 Plants

RPA 405. PRODUCTION OF FIELD CROPS WITH IMPROVED ACCEPTABILITY

Acceptability of field crops means acceptability of such crops, or portions thereof, for particular uses. These include food, fiber, and feed use. Concern must be directed to domestic and foreign preferences if the full market potential of field crops is to be realized.

Areas of research include:

- (a) Enhancing product attributes that influence acceptability by animals, processors, or consumers.
- (b) Determining the physical, chemical, and genetic bases of determinants of preferred qualities.
- (c) Breeding and selecting new and improved varieties of field crops that have favored characteristics including reduced contents of naturally occurring toxins.
- (d) Developing improved production practices to achieve optimum quality of product.

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5100 Increasing consumer acceptability of farm and forest products
- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 1400 Corn
- 1500 Grain sorghum
- 1600 Rice
- 1700 Wheat (see subcodes)
- 1800 Other small grains (see subcodes)
- 1900 Pasture
- 2000 Forage crops (see subcodes)
- 2100 Cotton (including cottonseed for plant purposes)(see subcodes)
- 2200 Cottonseed (for meal, oil, etc.)
- 2300 Soybeans
- 2400 Peanuts
- 2500 Other oilseed and oil crops (excluding cottonseed)(see subcodes)
- 2600 Tobacco (see subcodes)
- 2700 Sugar crops (see subcodes)
- 2800 Miscellaneous and new crops (see subcodes)
- 3800 Food (not readily associated with specific fruits and vegetables)
- 6700 Plants

RPA 406. NEW AND IMPROVED FOOD PRODUCTS FROM FIELD CROPS

New or improved food products and processes can provide better foods from field crops. They can make available new and more attractive products tailored to the requirements of specific domestic markets.

Areas of research include:

- (a) The chemistry of color, flavor, texture, and nutritive value.
- (b) The chemical and biochemical reactions which occur among constituents of foods and the factors which determine their rates.
- (c) Improvement of edible oils through removal or inactivation of constituents responsible for adverse quality effects.
- (d) Fortification to increase the nutritional value of foods.
- (e) Development of products and processing techniques to maintain or improve the stability and nutritional value of foods.

Exclude: (1) Research on new and improved maple products. (Use RPA 401).
 (2) Research on new and improved feed, textile and industrial products from field crops. (Use RPA 407).
 (3) Research on product development for foreign markets.
 (Use RPA 604).

Classification Guidelines:

Activities:

5400 Chemical and physical properties of food products
 5500 Developing new and improved food products and processes
 5800 Identification, measurement and maintenance of quality
 6400 Quality of family living, including housing, management and use of time, money and other resources

Commodities, etc.:

1400-2000, 2200-2500, 2700-2800, 3800 (See Commodity Classification - Table "B")
 6700 Plants

RPA 407. NEW AND IMPROVED FEED, TEXTILE, AND INDUSTRIAL PRODUCTS FROM FIELD CROPS

Increasing the potential of our agricultural land requires full utilization of its products. Industrial uses have traditionally absorbed significant quantities of grains and oilseeds in such consumer products as paper, textiles, adhesives and paints. With more sophisticated processing, these crops could be converted to a great variety of non-food uses.

Agricultural products such as cotton, starch, and oils have been challenged in the market place by non-agricultural products. To retain and expand markets, agricultural raw materials may need to be modified chemically and/or physically to provide desired properties at competitive prices. New end use opportunities include plastics, adhesives, plasticizers, lubricants, drugs, feed additives, and paper sizes and additives. The feed value of oilseed meals and of processed forages can be improved and costs of their processing and distribution reduced.

Areas of research include:

- (a) Chemical and physical properties of constituents of field crops.
- (b) Preparation of chemical derivatives.
- (c) Adaptation of derivatives for use in industrial products.
- (d) Development of improved engineering and processing methods.
- (e) Pharmacology of constituents and derivatives.
- (f) Modifications and treatments to improve textile characteristics such as flame resistance.
- (g) Chemical reactions that constituents undergo under conditions such as those encountered in feed processing.

Exclude: (1) Research on protection of feed supplies from harmful microorganisms, and processing to reduce or inactivate naturally occurring toxins in feeds. (Use RPA 702).

Classification Guidelines:

Activities:

- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 1400-2800 (See Commodity Classification - Table "B")
- 6700 Plants

RPA 408. QUALITY MAINTENANCE IN STORING AND MARKETING FIELD CROPS

Maintenance of quality of field crop commodities against the inroads of insects, molds, moisture, chemical changes, and other quality deteriorating factors is important to minimize costs in storage and distribution. This RPA includes maintaining quality of farm products in storage and distribution channels, whether on or off the farm.

Areas of research include:

- (a) Search for effective ways to reduce physiological deterioration and losses due to insects, molds, rodents and other pests.
- (b) Determining the effects and developing ways to control temperature, humidity, atmosphere in storage.
- (c) Containerization needed to maintain optimum conditions.
- (d) Biochemical reactions that occur in products after harvest.
- (e) Determination of the relationship among variables of handling, storage and crop conditioning and loss in quality.

Exclude: (1) Research on prevention, reduction or elimination of harmful microorganisms, mycotoxins and other naturally occurring toxins in field crops. (Use RPA 702).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4860 Protection against rodents and other mammals
- 4870 Protection against molds, fungi and other spoilage organisms
- 5400 Chemical and physical properties of food products
- 5600 Chemical and physical properties of non-food products
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 1400-2800 (See Commodity Classification - Table "B")
- 3800 Food (not readily identified with specific field crops)
- 6700 Plants

RPA 409. PRODUCTION OF ANIMAL PRODUCTS WITH IMPROVED ACCEPTABILITY

Acceptability of animal products varies widely among species and products. We should know why. Concern over the role of fat in the diet has focused attention on the problem of excess fat in beef, pork and lamb. Consumption trends for milk and eggs point toward acceptance problems for these products. More information is needed concerning what livestock product qualities are desired by consumers. Production should be tailored to these preferences.

Areas of research include:

- (a) Physiology and biochemistry of fats, proteins, and flavor components.
- (b) Influence of breeding, feeding, and management practices on quality of animal products.
- (c) Improving the acceptability of animal products through breeding, feeding, and management.
- (d) Factors responsible for development of flavor.
- (e) Reduction in amount of undesired fat in animal products.
- (f) Improved wool, hides, and other non-food animal products.

Exclude: (1) Research on bees and honey. (Use RPA 314).
 (2) Research on fish, shellfish, game and fur-bearing animals and other wildlife (B-0800). (Use RPA 904).

Classification Guidelines:

Activities:

- 4900 Biology of plants and animals
- 5100 Increasing consumer acceptability of farm and forest products
- 5400 Chemical and physical properties of food products
- 5600 Chemical and physical properties of non-food products
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 3800 Food (not readily associated with specific animal products)
- 6800 Animals (Vertebrates)

RPA 410. NEW AND IMPROVED MEAT, MILK, EGGS, AND OTHER ANIMAL FOOD PRODUCTS

The development of new and improved meat, milk, eggs, and other animal food products and processing may reduce costs, increase variety and expand markets for these foods. Some products can also be tailored to simplify home storage, reduce time required for preparation, and, in case of meats, develop more attractive products from low-value or low quality cuts. Other products can be developed for special uses and to minimize weight.

Areas of research include:

- (a) Improved techniques for stabilization through freezing, sterilization, dehydration, or combinations of these.
- (b) New or improved products through fortification and better formulation.
- (c) Development or improvement of engineering and processing methods to maintain or improve the stability and nutritional value of foods.
- (d) Methods of decreasing product weight and bulk to reduce storage, transportation and distribution costs.
- (e) Chemistry and color, flavor, texture and nutritive value.
- (f) Chemical and biochemical reactions which occur among the constituents and the factors which determine their rates.
- (g) Development of food concentrates from fish.

Exclude: (1) Research on bees and honey. (Use RPA 314).
 (2) Research on product development for foreign markets.
 (Use RPA 604).

Classification Guidelines:

Activities:

- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5800 Identification, measurement and maintenance of quality
- 6400 Quality of family living, including housing, management and use of time, money and other resources

Commodities, etc.:

- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats. (see subcodes)
- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 3800 Food (not readily associated with specific animal products)
- 6800 Animals (Vertebrates)

RPA 411. NEW AND IMPROVED NON-FOOD ANIMAL PRODUCTS

Animal byproducts have traditionally contributed significantly to our livestock economy as raw materials for the textile, leather, soap, feed, pharmaceutical, and other industries. In more recent times, industrial research has developed from alternative raw materials, mostly petrochemical, new products having attractive properties for some of these end uses. These synthetic fibers, detergents and shoe-making materials have become highly competitive with farm products. Agricultural raw materials have many useful properties frequently not possessed by the synthetics. New technology promises to add other desired properties such as permanent press in wool, and biodegradability in detergents from fats. Research has also developed useful new plasticizers and surface coatings from agricultural products.

Areas of research include:

- (a) Chemical and physical properties of hides, wool, skins, and animal fats.
- (b) Engineering in the processing of new and improved products.
- (c) Reduction of product wastage in processing.
- (d) Methods of processing or treating wool to increase its use and furnish properties desired by consumers.
- (e) Cross-bonding agents and improved tanning processes to develop new uses for leather, sheepskins, and shearling skins.
- (f) Development of polymers, detergents, lubricants and chemical intermediates from animal fats.
- (g) Development of feed concentrates from fish.

Classification Guidelines:

Activities:

- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats (see subcodes)
- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 6800 Animals (Vertebrates)

RPA 412. QUALITY MAINTENANCE IN MARKETING ANIMAL PRODUCTS

Maintenance of quality in storage and transport of perishable livestock products and protection against the inroads of spoilage microorganisms, insects, moisture, and deleterious chemical, physical and physiological changes is important.

Areas of research include:

- (a) Biochemical changes during storage.
- (b) Determining the effects and developing ways to control temperature, humidity, and atmosphere in storage and transportation.
- (c) Development of containerization to maintain optimum conditions.
- (d) Search for effective ways to control physiological changes in color, flavor, texture and nutritive value and reduce losses due to microorganisms and insects.

Exclude: (1) Research on prevention, reduction or elimination of harmful microorganisms, mycotoxins, and other naturally occurring toxins in animal products. (Use RPA 702).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4870 Protection against molds, fungi and other spoilage organisms
- 5400 Chemical and physical properties of food products
- 5600 Chemical and physical properties of non-food products
- 5800 Identification, measurement and maintenance of quality

Commodities, etc.:

- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats (see subcodes)
- 2900 Poultry (see subcodes)
- 3000 Beef cattle
- 3100 Dairy cattle (see subcodes)
- 3200 Swine
- 3300 Sheep and wool
- 3400 Other animals (see subcodes)
- 3800 Food (not readily associated with specific animal products)
- 6800 Animals (Vertebrates)

GOAL V

IMPROVE EFFICIENCY IN THE MARKETING SYSTEM

The larger share of the consumer dollar is being spent for marketing rather than producing farm and forest products. The potential is great for reducing marketing costs. Greater efficiency of assembling, handling, processing, packaging, storing, transporting, wholesaling and retailing farm and forest products would reduce prices paid by consumers, increase returns to farmers and marketers, and expand markets.

RPA's 501-503, 506-513, inclusive: Pages 118-129, inclusive.

RPA 501. IMPROVEMENT OF GRADES AND STANDARDS - CROP AND ANIMAL PRODUCTS

Grades and standards are designed to describe characteristics of a product which affect its value to users. They are necessary either because the buyer or seller cannot appraise these characteristics by inspection or because buyers and sellers wish to execute sales on the basis of product description without inspection. Thus, effective grades and standards assist buyers in obtaining product characteristics they desire and sellers in obtaining appropriate compensation for what they sell. Costs of buying and selling are greatly reduced when, because of grades and standards, a buyer does not need to personally inspect each lot which he purchases.

The usefulness of market information, important in the conduct of trade and establishment of a fair price, is dependent upon adequately descriptive grades and standards. Many current grades and standards are not as useful as they could be because they do not adequately cover the characteristics desired by users. Others could be improved by the substitution of objective measurement of characteristics for the subjective techniques now in use.

Areas of research include:

- (a) Quality characteristics desired by buyers, including processors and handlers as well as consumers.
- (b) Finding easily measureable characteristics that can be used to distinguish levels of quality found in products.
- (c) Developing objective measures of quality to replace subjective ones.
- (d) Developing procedures to update grades and standards to realistically reflect production practices.
- (e) Determining the need for and developing grades and standards for products not now covered.
- (f) Evaluating the effectiveness of particular grades and standards in meeting the requirements of buyers and sellers.

Exclude: (1) All research relating to grades and standards for ornamentals and turf (Use RPA 906).
 (2) All research relating to grades and standards for bees and other pollinating insects and their products (Use RPA 314).

Classification Guidelines:

Activities:

5800 Identification, measurement and maintenance of quality

Commodities, etc.:

0800-1200, 1400-3400, 3600, 3800, 6200 (See Commodity Classification - Table "B")
 6700 Plants
 6800 Animals (Vertebrates)

RPA 502. DEVELOPMENT OF MARKETS AND EFFICIENT MARKETING OF TIMBER AND RELATED PRODUCTS

Development of markets and efficient marketing of timber and related products may help to maintain the incomes and employment associated with the timber industry. Non-wood products have penetrated many traditional markets for wood materials in construction, manufacturing, shipping, and other uses. Research to evaluate opportunities for market expansion through more efficient processing and marketing of timber products is essential to maintain and improve the competitive position of wood, and wood and timber related products.

Areas of research include:

- (a) Analysis of performance requirements for various wood products in construction and other markets.
- (b) Determining consumer attitudes and preference for various wood materials and relationships to performance requirements.
- (c) Changes in processing and distribution practices that would lead to increased marketing efficiency and lower costs.
- (d) Appraisals of the economic feasibility of developing markets for underused or low-quality timber.
- (e) Cost reductions through improved organization and management of marketing and processing firms.
- (f) Relationships involved in the size of marketing firms, number and composition of products handled, and marketing and processing costs.
- (g) Effects on marketing and processing costs and user demand of such characteristics of raw material supply as quality, dependability, and availability within an economic distance.
- (h) Market development and marketing efficiency for forest products other than timber including naval stores, maple syrup, chemicals derived from trees, Christmas trees, etc.

Classification Guidelines:

Activities:

- 5800 Identification, measurement and maintenance of quality
- 5900 Improving economic and physical efficiency in marketing
- 6000 Analysis of supply, demand and price, including inter-regional competition
- 6100 Developing domestic markets, including consumer preference and behavior
- 6200 Foreign trade, market development and competition

Commodities, etc.:

- 0600 Trees, forest and forest products (see subcodes)

RPA 503. EFFICIENCY IN MARKETING AGRICULTURAL PRODUCTS AND PRODUCTION INPUTS*

The farm supply, processing, and marketing sectors account for a large percentage of the retail value of food and fiber. Thus, there are large potential returns from research to improve the efficiency of these sectors of the agricultural industry. Use of out-dated, inefficient marketing facilities, equipment, and methods contributes to the cost of supplying production inputs and moving food and fiber products from the farm to consumers. Research can identify and develop ways to reduce these costs. As consumers continue to demand more marketing services, the importance of efficiency in marketing will become even greater.

Areas of research include:

- (a) Determining the effects of marketing facility layout, equipment, and methods on handling costs, and developing the types of facilities and combinations of facilities that will move production inputs to the farm and farm products from farms to consumers most efficiently.
- (b) Evaluating and designing transportation equipment and handling methods to reduce losses and handling costs.
- (c) Effects of characteristics of raw products such as quality, stability and physical characteristics on marketing and processing costs.
- (d) Routing products from producers to consumers in such a way as to minimize transportation and processing costs.
- (e) Optimum size and location of facilities for specified levels of output.
- (f) Improved techniques for managerial decision making and communications within the firm.

Classification Guidelines:

Activities:

5900 Improving economic and physical efficiency in marketing including analysis of market structure and functions

Commodities, etc.:

0900-1200, 1400-3400, 3600-3900, 4600-4800 (See Commodity Classification - Table "B")

6700 Plants

6800 Animals (Vertebrates)

*(This RPA incorporates research formerly included under RPA's 503, 504, and 505)

RPA 506. SUPPLY, DEMAND, AND PRICE ANALYSIS - CROP AND ANIMAL PRODUCTS

Reliable forecasts of supply, demand, and prices of farm products are essential to efficient and orderly marketing. Individual producers, processing and marketing firms, and end users base daily decisions upon information about and forecasts of future supply, demand, and price conditions. Sound public policy decisions on acreage control, surplus diversion, and food assistance to developing countries are dependent upon such information. The farm supply industries need similar data on goods and services purchased by producers so that they may make orderly adjustments to prospective changes in supply, demand, and price of production inputs.

Some large firms employ staffs to carry out sophisticated analyses of the many interrelated factors that must be considered in forecasting supply, demand, and price. Small firms, most farmers, and consumers do not have the resources for such analyses. Their bargaining power would be greatly reduced if information from public sources were not available to them.

Areas of research include:

- (a) Effects of changes in supply of individual commodities on farm product prices, marketing spreads, and consumer prices.
- (b) Effects of changes in supply of one commodity on prices and spreads for substitute and complementary products.
- (c) Effects of income, level of education, type of residence, and other consumer characteristics on demand.
- (d) Effects of such characteristics of supply as variability of production on user demand.
- (e) Seasonal patterns of consumer demand and effects of special events such as religious and national holidays and unusual supply and demand patterns as a result of weather extremes.
- (f) Effects of new production and processing technology and of technological developments in production of synthetics on demand for farm products.
- (g) Development of improved techniques for collecting consumption data for use in long-range projections of demands.

Classification Guidelines:

Activities:

6000 Analysis of supply, demand and price, including inter-regional competition

Commodities, etc.:

0800-1200, 1400-3400, 3600-3800 (See Commodity Classification - Table "B")
 4400 Agricultural economy of United States and sectors thereof, including interrelationships with the total economy
 6700 Plants
 6800 Animals (Vertebrates)

RPA 507. COMPETITIVE INTERRELATIONSHIPS IN AGRICULTURE

Competitive interrelationships in agriculture change with the development of new technology, shifts in consumer tastes, and organizational changes in the farm supply, production and marketing sectors. An understanding of the changing competitive position of regions and industry groups is necessary to sound management decisions, particularly long-term investment decisions by farm operators and managers of agriculture-related firms. The development of sound public agricultural policy requires estimates of its probable impact on the competitive position of farmers in different regions.

Areas of research include:

- (a) The competitive position of different regions and industry groups in the production and marketing of agricultural products.
- (b) The potential impact of changes in transportation costs, wage rates, technology, rates of population growth and other factors on the competitive position of the various regions producing or handling crop and livestock products.
- (c) The potential for a product to compete with other farm products for the use of the land, labor and other production resources in a geographic area.

Classification Guidelines:

Activities:

- 6000 Analysis of supply, demand and price, including interregional competition
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0900-1200, 1400-3400, 3600-3800 (See Commodity Classification - Table "B")
- 6700 Plants
- 6800 Animals (Vertebrates)

RPA 508. DEVELOPMENT OF DOMESTIC MARKETS FOR FARM PRODUCTS

Farm products compete with other goods and services for the consumer's dollar. A few are widely advertised by processors. Many suffer from relatively inadequate presentation of their value to consumers. Some products are not readily available to all consumers or are not available in the forms which consumers desire. When new products are developed, commercialization depends upon evaluation of market potential so as to attract venture capital into their production.

Substantial investments are being made by farmer-supported organizations in an effort to improve farm product merchandising. These groups look to research to evaluate these activities and to guide them to more effective alternatives.

Areas of research include:

- (a) Market potential of new products.
- (b) Availability of products to users and consumers in the existing marketing system and factors affecting their availability.
- (c) Consumer response to alternative advertising, educational and promotional techniques and activities.
- (d) Consumer preference studies except as noted below:

- Exclude:
- (1) Research on development of markets and more efficient marketing of timber products. (Use RPA 502).
 - (2) Research on production of farm products with improved consumer acceptability. (Use RPA 402, 405, or 409).
 - (3) Research on development of new and improved products. (Use RPA 401, 403, 406, 407, 410, or 411).
 - (4) Research on specific consumer preference studies on
 - wood products (Use RPA 502)
 - bees and honey (Use RPA 314)
 - recreation (Use RPA 902)
 - fur-bearing animals, fish, etc. (Use RPA 904)
 - trees to enhance environment (Use RPA 905)
 - ornamentals and turf (Use RPA 906).

Classification Guidelines:

Activities:

6100 Developing domestic markets, including consumer preference and behavior

Commodities, etc.:

0800-1200, 1400-3400, 3600-3800, 4700 (See Commodity Classification - Table "B")
 6700 Plants
 6800 Animals (Vertebrates)

RPA 509. PERFORMANCE OF MARKETING SYSTEMS

Performance is a measure of the consequences or benefits that flow from alternative methods of performing the marketing functions. One such measure has been farm-to-retail price spreads over time for the market in the aggregate, as well as for individual commodities. Changing price spreads provide timely signals of market adjustments. But, an interpretation of the nature of such developments in relation to performance requires exacting analyses of organization characteristics and practices of marketing firms and subsectors. Industry concentration, the occurrence of mergers, various dimensions of integration and diversification and other structural elements are essential ingredients of studies seeking an explanation of market performance.

While structural analyses provide many helpful clues about market performance, they are a step away from the achievement of a total overview that can be gained by regarding the market as a dynamic operating system characterized by interlocking activities and interactions. Economic linkages and interdependencies among market participants need to be identified and the products and outcomes of such configurations translated into various equity interpretations to arrive at conclusions about market performance in the broadest sense. Ideally, performance should be equated with the interests of farmers, marketing firms, capital suppliers, labor, and consumers. In this context, market structure analysis is not an end in itself but rather a major component of a systems approach to market analysis.

Areas of research include:

- (a) Simulation and behavioral models of industry systems and subsystems for use in evaluating performance in terms of efficiency and participant equity.
- (b) Economic intelligence on the changing structure of marketing systems, including size and number of firms, patterns of ownership, development of integrated and contractual relationships and competitive practices of marketing firms.
- (c) Estimates of the aggregate effects of adjustments by individual firms in an industry on costs, prices, and marketing margins.
- (d) The effect on market performance of public utility and transportation industry adjustments to public programs, policies, and regulations, e.g. the Interstate Highway System.
- (e) Expected effects on the firm of public programs and legal restraints such as licensing, tax regulations, grades and standards, and sanitation requirements.
- (f) Effects of market coordination and integrating on price determination and on the efficiency of price as an allocative mechanism.

RPA 509. (Continued)

Classification Guidelines:

Activities:

- 5900 Improving economic and physical efficiency in
marketing including analysis of market structure and
functions
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0900-1200, 1400-3400, 3600-3900, 4600-4800 (See Commodity
Classification - Table "B")
- 6700 Plants
- 6800 Animals (Vertebrates)

RPA 510. GROUP ACTION AND MARKET POWER

Research on group action and market power is essential to help producers and agricultural marketing, purchasing, and service organizations adjust to a changing agricultural production pattern, a changing market structure, increasing urbanization, and increasing rural, non-farmer residency. Cooperatives, marketing orders and agreements, and other types of group effort offer potential for strengthening or improving the economic and social position of farmers and other rural residents.

Areas of research include:

- (a) Effectiveness of alternative forms of group action under different supply, demand, and price relationships.
- (b) Design and development of appropriate institutional devices for bargaining.
- (c) Role of the individual in group action related to marketing and purchasing.
- (d) Effectiveness of organizational structures in serving rural people in relation to ownership control, financial requirements, management capabilities, and market responsibility.
- (e) Determination of additional, modified, or new services and techniques that can be used by agricultural and other types of rural associations.

Classification Guidelines:

Activities:

- 5900 Improving economic and physical efficiency in marketing including analysis of market structure and functions
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 4600 Farmer cooperatives
- 4700 Marketing, processing and supply firms other than cooperatives
- 4800 Marketing systems and sectors thereof

RPA 511. IMPROVEMENT IN AGRICULTURAL STATISTICS

Accurate information concerning production, marketing, and pricing of farm products is essential for research and is needed by farmers, private industry and government for wise decision making. Dynamic changes in the whole fabric of agricultural production, processing and marketing have greatly expanded the amount, precision, and detail of information needed, and introduced new problems of collecting this information. One of the dynamic changes has been the integration of supply, production and marketing functions. With the increase in integration, the points at which meaningful data have traditionally been collected are losing their relevance.

A new structuring of the statistics is essential to bring statistical measures into agreement with the actual production and marketing system. The field of statistics relating to agriculture including farm income and population and market prices of farm products is in need of improvement. Traditional methods of collection and estimation of economic statistics for agriculture cannot produce the data needed to analyze, define and quantify the dynamic changes in agriculture. The reconstruction of the statistical program in terms of content and parameters to be estimated will require much research effort in addition to research in the techniques of effective and efficient data collection.

Areas of research include:

- (a) Definitions and concepts needed for statistical purposes, together with establishment of criteria for classifying agricultural enterprises.
- (b) Questionnaire and survey design and definitions to reduce non-sampling errors in collection of crop, livestock, yield, production, price, farm labor, and other agricultural data.
- (c) Sampling frames - both simple and multiple - to obtain data on yield, production, price, and labor.
- (d) Methods of forecasting and estimating yield.
- (e) Application of new technology in transmission and data processing.
- (f) Use of administrative records associated with various public programs as sampling frames and as sources of data.

Exclude: (1) Research on the application of remote sensing techniques to crop and livestock estimates. (Use RPA 113).

Classification Guidelines:

Activities:

- 7400 Improvement of agricultural statistics
- 7500 Development of research equipment and technology

Commodities, etc.:

- 6400 Experimental design and statistical methods
- 7000 Research equipment and technology

RPA 512. IMPROVEMENT OF GRADES AND STANDARDS - FOREST PRODUCTS

Grades and standards describe the characteristics of a product so that producers and processors, and buyers and sellers can gauge product utility. Tree grades provide a means of more effectively valuing growing stock, thus assisting the producer to set specific goals for silvicultural practice and to obtain true value for stumpage. Log grades reduce the uncertainty in product transactions and permit sorting logs for their highest use, to the benefit of both buyer and seller. Standards for processed forest products likewise assist buyers in obtaining product characteristics they desire and sellers in obtaining appropriate compensation for what they sell. Because wood is heterogenous material, the efficiency of wood markets depends to a large degree on a system of accurate and understandable grades and standards.

Areas of research include:

- (a) Analysis of the bases for selection of quality criteria used in process and product specifications.
- (b) Determining the relationships between product specification, physical characteristics of trees and logs, and process capability.
- (c) Developing techniques for evaluating product quality level.
- (d) Describing product quality characteristics and variations for which grades and standards should be developed.
- (e) Evaluating the effectiveness of particular grades and standards in meeting the requirements of buyers and sellers.

Classification Guidelines:

Activities:

5800 Identification, measurement and maintenance of quality

Commodities, etc.:

0600 Trees, forests and forest products (see subcodes)

RPA 513. SUPPLY, DEMAND AND PRICE ANALYSIS - FOREST PRODUCTS

Improved forecasts of supply, demand, and prices of forest products are essential to more efficient and orderly planning for production and marketing. Individual producers, processing and marketing firms, and end users base decisions upon information about the forecasts of future supply, demand and price conditions. Public policy on forest use is likewise dependent on such information. The forest supply industries need similar data on goods and services purchased by producers so that they may make orderly adjustments to prospective changes in supply, demand and price of production inputs.

Areas of research include:

- (a) Development of improved techniques for collection of data.
- (b) Effects of changes in supply of individual commodities upon stumpage prices, marketing spread, and consumer prices.
- (c) Effects of changes in supply of one commodity upon prices and spreads for a substitute product.
- (d) Effects of income, level of education, type of residence and other consumer characteristics on demand.
- (e) Effects of such characteristics of supply as variability of production upon user demands.
- (f) Seasonal patterns of consumer demands.
- (g) Effects of new production and processing technology and technological developments in production of synthetics on demand for forest products.
- (h) Impact of current and proposed government programs on supply, demand and price.
- (i) Evaluation of methods of collecting data and disseminating market information.

Classification Guidelines:

Activities:

- 6000 Analysis of supply, demand and price, including interregional competition
- 7400 Improvement of agricultural statistics

Commodities, etc.:

- 0600 Trees, forests and forest products (see subcodes)
- 3600 General purpose supplies
- 3900 Structures and facilities (see subcodes)

GOAL VI

EXPAND EXPORT MARKETS AND ASSIST DEVELOPING NATIONS

Our agricultural products contribute prominently to our balance of payments position. The potential is far greater. We need more and better sales promotion efforts. We need to direct more effort toward producing and marketing to meet specific market preferences and to developing preferences for desirable attributes our products already have. We need much more knowledge of how to establish foreign markets, how to organize production and marketing to meet export demand, and what potential our products have in foreign markets.

Our sense of moral responsibility impels us to help people in need. At the same time our abundant food, fiber, and agricultural technology represent our most effective instrument of foreign policy. Agricultural and forestry technical assistance will help developing nations produce more of their own food needs, contribute to their economic growth, and lead to expanded export markets for us. Our productive capacity can serve a useful and humanitarian purpose in helping to feed hungry people wherever the need exists. Much ingenuity will be required in order to accomplish this humanitarian objective without upsetting world markets and internal economies of the countries involved.

RPA's 601-604, inclusive: Pages 131-134, inclusive

RPA 601. FOREIGN MARKET DEVELOPMENT

Foreign markets are extremely important for U.S. farmers. Agricultural exports use the production from one out of every five acres harvested. Farm product sales abroad account for about one-fifth of all exports and thus make a significant contribution to the U.S. balance-of-payments. However, due to growing protectionism and production increases in foreign countries, U.S. agricultural exports have declined since 1966. This decline raises such questions as: Do we face increased impediments to trade? Is our comparative advantage in agricultural production and trade deteriorating? Because of the importance of export markets and the increased degree of competition for these markets, it is necessary that improved information be made available for use by the U.S. Department of Agriculture and by exporters in developing export strategies?

Areas of research include:

- (a) Prediction of trade levels by analysis of current and prospective changes in population, incomes, price levels; domestic agricultural production, and economic development of importing countries; and the development of economic models to predict trade levels.
- (b) Effects of regionalization, changing trade policies, and market organizations in importing countries on U.S. agricultural exports.
- (c) Effectiveness of promotional programs for expanding foreign markets.
- (d) Trade agreements and other government programs as methods of expanding exports of farm products.
- (e) Analysis of current and prospective trends in production, trade, and consumption in competitor countries.
- (f) Determination of the countries or regions which have a comparative advantage in the production of specific agricultural commodities.
- (g) Determination of needs for new and improved products and processing and packaging methods that appeal to the preference of consumers in other countries and better maintain the quality of the product.

Exclude: (1) Research on the development of new and improved products and processing and packaging. (Use RPA 604).

Classification Guidelines:

Activities:

- 6200 Foreign trade, market development and competition
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0600, 0800-1200, 1400-3400, 3600-3800, 4400, 4500 (See Commodity Classification - Table "B")

RPA 602. EVALUATION OF FOREIGN FOOD AID PROGRAMS

Our country is subsidizing large scale exports of food annually to countries that do not have enough foreign exchange to buy this food for their under-nourished people. Research is needed to analyze the effects of food aid on economic development, agricultural productivity, and trade of the recipient countries. There is little prospect that domestic production of many developing countries plus commercial imports will be adequate to fill their food and fiber needs for some years to come. Effective food aid from countries with exportable surpluses can permit continued economic development in countries where shortages in food production occur. The local currencies derived from food aid also provide a valuable resource that, under appropriate guidelines, can be used to promote economic development.

Areas of research include:

- (a) How food aid can best contribute to the economic development of the recipient country with the least disruption of commercial markets, including those for domestic products.
- (b) The probable volume and duration of food aid needed.
- (c) The impact on U.S. farm income and relative program cost as a consequence of relaxing our production controls and expanding concessional exports.
- (d) Ways of increasing the efficiency of handling food aid in the recipient country, including labor, transportation, and storage.
- (e) Use of food aid or local currency receipts from sale of food aid as wage goods in the development of roads, schools, and other public facilities necessary for the development of a modern economy in the recipient country.
- (f) Measurement of the extent to which diets in developing countries fall short of minimum nutritional requirements as published in WORLD FOOD BUDGET.

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 4500 Agricultural economy of foreign countries and sectors thereof, including interrelationships with the total economy

RPA 603. TECHNICAL ASSISTANCE TO DEVELOPING COUNTRIES

In recognition of our vital stake in a peaceful and prosperous world, the U.S. has undertaken programs of technical assistance to developing countries. Economic development in most of them, at least in the early stages, is largely a matter of improving the productivity of their agriculture. A developing agriculture supplies a means of capital accumulation, provides an expanding market for the products of other industries, and eventually releases workers to other sectors of the economy.

Areas of research include:

- (a) Development of new technology for increasing yields and output of farm products and enhancing marketing and distribution activities through (1) adaptation to local conditions of methods proved effective elsewhere, and (2) developing new methods specifically for use in the developing country or local area.
- (b) Determination of conditions that promote or retard improvements in agricultural productivity, such as educational levels, cost-price relationships, availability of improved production technology, and cultural, legal and institutional factors.
- (c) Determination of optimum allocation of resources for agricultural vs. non-agricultural development, and for production of farm products for domestic use vs. production of farm products for export.
- (d) Ways of choosing, developing, and training native research personnel to staff the developing country's agricultural research and teaching programs.
- (e) Evaluation of the effects of educational programs on production practices, nutrition, health, sanitation, housing, and techniques of leadership development.
- (f) Contribution to economic development by organizational groups such as cooperatives, service agencies, and youth groups.

Classification Guidelines:

Activities:

4100-7500 (See Activity Classification - Table "A")

Commodities, etc.:

0100-7000 (See Commodity Classification - Table "B")

RPA 604. PRODUCT DEVELOPMENT AND MARKETING FOR FOREIGN MARKETS

Sales of farm products abroad are an important source of income for American farmers and they contribute substantially to the U.S. balance of payments. Product development and processing is an essential phase of meeting the particular requirements of different foreign groups. In addition processing may serve to reduce transportation costs by putting products in more concentrated forms and eliminating waste portions prior to shipment.

Another vital factor in the competition for foreign markets is efficiency in the performance of the various functions that make up the total process of marketing. The functions include packaging, handling, transportation, and quality maintenance. The marketing abroad of products of agricultural origin poses many problems such as distance, climate, food habits and food safety laws. Success in dealing with these problems requires continuing research.

Areas of research include:

- (a) Developing new and improved products that appeal to consumers in foreign countries, and efficient processing methods to derive these products.
- (b) Developing supplemental protein foods and various types of fortified foods for use in countries with specific dietary deficiencies.
- (c) Developing processed foods from plentiful raw materials that will appeal to foreign tastes and induce new food habits.
- (d) Modifying existing non-food products obtained from agricultural materials and developing new ones for specific foreign markets.
- (e) Developing containers and packages suited to overseas transportation requirements and foreign consumer preferences.
- (f) Determining food safety and quality requirements in foreign countries and developing market practices to meet these requirements.

Classification Guidelines:

Activities:

- 5400 Chemical and physical properties of food products
- 5500 Developing new and improved food products and processes
- 5700 Developing new and improved non-food products and processes
- 5900 Improving economic and physical efficiency in marketing including analysis of market structure and functions
- 6200 Foreign trade, market development and competition

Commodities, etc.:

0600, 0800-1200, 1400-3400, 3600-3800 (See Commodity Classification - Table "B")

GOAL VIIPROTECT CONSUMER HEALTH AND IMPROVE NUTRITION AND WELL-BEING OF
THE AMERICAN PEOPLE

The public expects agriculture to produce and market foods that it can buy with confidence. This means food that is wholesome and free from harmful pesticide residues, disease agents or toxic substances. While this nation has a food supply that cannot be surpassed for wholesomeness anywhere else in the world, there is ample room for improvement, particularly with respect to microbiological safety and chemical residues. Also, we are concerned with helping people in the selection, construction, and care of clothing and textiles, and in controlling insect pests of man and his belongings.

In spite of our abundant food supply, about 10 percent of our families have poor diets. We should be able to reduce this to 5 percent by 1980 and 1 percent by 2000. We have better knowledge of optimum diets for some of our livestock than for our people. We need to know how to blend our plentiful food supply into better diets for buoyant health and longevity.

RPA's 701-709, inclusive: Pages 136-145, inclusive.

RPA 701. INSURE FOOD PRODUCTS FREE OF TOXIC CONTAMINANTS INCLUDING RESIDUES
FROM AGRICULTURAL AND OTHER SOURCES

Research on toxic residues of agricultural origin is needed to determine the levels and circumstances under which chemicals may be safely used in crop or livestock production. There is widespread public concern as to the nature and seriousness of the hazards caused by the use of chemicals in the production of farm products. Farmers have a vital stake in the detection and elimination of these hazards because of their possible effects on human health, the resulting hesitancy on the part of consumers to buy certain farm products, and the income loss that may occur if products are not acceptable.

Areas of research include:

- (a) Safe levels of residues on or in farm products for human consumption.
- (b) The behavior and fate of pesticides and other applied chemicals in and on plants, animals and their products.
- (c) The nature and permanence of toxic metabolites produced by plants or animals which have absorbed or consumed pesticides or other chemicals and methods of removing them or reducing their concentration.
- (d) Quick and accurate methods for monitoring pesticide residue levels in or on crop and livestock products.
- (e) Development of equipment and facilities to reduce or eliminate toxic residues from agricultural sources.

Exclude: (1) Research on safe disposal of pesticide materials. (Use RPA 901).
(2) Research to reduce ingestion of harmful pesticides and other chemicals in or on animal feeds. (Use RPA 213).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4700 Protection against weeds and their control agents
- 4830 Protection against pollutants
- 4880 Protection against allergens, toxins and poisonous plants

Commodities, etc.:

0900-1200, 1400-2000, 2200-2500, 2700-3400, 3800, 6100, 6300, 6700, 6800 (See Commodity Classification - Table "B")

RPA 702. PROTECT FOOD AND FEED SUPPLIES FROM HARMFUL MICROORGANISMS AND NATURALLY OCCURRING TOXINS

Agriculture has a responsibility for ensuring the production of foods and feeds which are safe to eat. The United States enjoys a reputation for food supplies that are microbiologically among the safest in the world. Nevertheless, salmonellas, staphylococci, botulini and other harmful microorganisms are a constant threat in inadequately processed or preserved foods and feeds. Mycotoxins, such as those affecting peanuts and naturally occurring toxins such as gossypol also affect food and feed supplies. The Public Health Service has determined that salmonellosis in humans is a significant problem. Agriculture must reduce the risk to man from these and other harmful microorganisms and toxins.

Areas of research include:

- (a) Methods for freeing breeding and production herds and flocks from Salmonella and other harmful microorganisms.
- (b) Ways to provide livestock and poultry with feeds that are free from harmful microorganisms.
- (c) Prevention of transmission of harmful microorganisms from human carriers to livestock and feed or food supplies.
- (d) Production of microbiologically safe foods.
- (e) Maintenance of microbiological safety in handling, processing, packaging and distributing food products.
- (f) Improved methods of food handling, storage, and preparation at home or in institutions for greater microbiological safety.
- (g) Methods for preventing or eliminating mycotoxins in peanuts and other field crops.
- (h) Methods of preventing, removing or controlling naturally occurring toxins and allergens in agricultural products.

- Exclude:
- (1) Production of field crops with improved acceptability where the objective is to reduce naturally occurring toxins. (Use RPA 405).
 - (2) Protection of livestock and poultry from poisonous plants. (Use RPA 213).

Classification Guidelines:

Activities:

- 4830 Protection against Pollutants
- 4870 Protection against molds, fungi and other spoilage organisms
- 4880 Protection against allergens, and toxins
- 4890 Protection against radiation and other hazards

Commodities, etc.:

- 0800-1200, 1400-2000, 2200-2500, 2700-3400, 3600, 3800,
- 4000, 4100 (See Commodity Classification - Table "B")
- 6200 Seed research

RPA 703. FOOD CHOICES, HABITS, AND CONSUMPTION

Knowledge of what people actually eat and why is limited. The problems in this area are complex and difficult to investigate. Many factors are involved when people make their food choices. Patterns of food consumption have important implications for well-being throughout the life span.

The profile of food choices of people in our country are reflected in food consumption patterns. Knowledge about food consumption patterns is needed to provide the basis for evaluating nutritional adequacy of segments of the population.

Knowledge of food choices and habits of people, ways to motivate people to change where needed, together with food consumption patterns, form the basis for the establishment of educational programs and other action programs to improve nutrition in different groups.

Areas of research include:

- (a) The economic, psychological, sociological, and physiological factors associated with age, ethnic and income groups that function as determinants and motivating forces in making food choices.
- (b) Food habits, understanding, and misconceptions about nutrition.
- (c) Methods of informing people about the relationship of food to health
- (d) Methods of stimulating people to improve their food habits, including analysis of the process of attitude and behavior change.
- (e) Food consumption patterns of the nation, and of various population groups.
- (f) Evaluation of the effects of programs to improve nutritional status on food choices.
- (g) Computer approaches to diet and menu planning.

Classification Guidelines:

Activities:

- 6300 Nutritional values, consumption patterns, and eating quality of foods
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0800-1200, 1400-2000, 2200-2500, 2700-3400, 3800, 4000, 4100
(See Commodity Classification - Table "B")

RPA 704. HOME AND COMMERCIAL FOOD SERVICE

Guidelines are necessary to insure the wholesomeness, nutritional value, taste, appearance and safety of both commercially and home prepared foods. Methods for improved preparation and storage of food that reduce waste, and assure quality and safety of food are needed to increase consumer appeal.

Commercially prepared foods are moving to the public through newly developed channels of distribution. Trends are apparent in automatic vending of more foods; in central preparation of food for large groups; and in more centralization of food preparation for restaurant and home use. Each new development in food preparation requires the determination of factors related to palatability, wholesomeness, safety, and nutritional value and an assurance of consumer acceptance.

Areas of research include:

- (a) Factors that achieve the highest quality of food prepared at home or commercially.
- (b) Effects of different methods of preparation, holding and serving food on wholesomeness, nutrient content, quality and consumer satisfaction.
- (c) Knowledge regarding the effects and interrelationships of factors such as time and temperature in the preparation of food at home or commercially.
- (d) Adaptation of computer approaches to food preparation and services
- (e) Development of methods to provide effective, efficient management in institutional and commercial food services.
- (f) Development of guidelines for product labeling to improve consumer information about product quality, preparation and storage, nutritional values and unit cost of foods for home and commercial use.

Classification Guidelines:

Activities:

6300 Nutritional values, consumption patterns and eating quality of foods

Commodities, etc.:

0800-1200, 1400-2000, 2200-2500, 2700-3400, 3800, 4600-4700
(See Commodity Classification - Table "B")

RPA 705. SELECTION AND CARE OF CLOTHING AND HOUSEHOLD TEXTILES

Research on the purchase, use and care of clothing and household textiles is needed to assist consumers in obtaining greater service from products derived from agricultural raw materials. Research is needed to provide knowledge about the products of agriculture used in clothing and household textiles and on the choices that consumers make of these products.

Areas of research include:

- (a) Determination of the properties of agricultural fibers which affect consumer satisfaction when such fibers are used in textiles, clothing, and for other household purposes.
- (b) Methods of predicting fabric performance in service.
- (c) Combinations of fibers and fabrics that will best meet consumer preferences and needs.
- (d) Safe, economical and efficient methods of care and maintenance of clothing and household textiles, with emphasis on new developments in fibers and finishes.
- (e) Factors influencing consumption patterns for clothing and household textiles of families according to income, and stages in the family cycle, as a basis for developing budgets of expenditures for these items by families.
- (f) The effect of drycleaning and laundering on survival of harmful microorganisms and viruses.

Exclude: (1) Research on control of insect pests affecting clothing, carpeting and other textiles. (Use RPA 706).

Classification Guidelines:

Activities:

- 4830 Protection against pollutants
- 4870 Protection against molds, fungi, and other spoilage organisms
- 5100 Increasing consumer acceptability of farm and forest products
- 5600 Chemical and physical properties of non-food products
- 5700 Developing new and improved non-food products and processes
- 6400 Quality of family living, including housing, management and use of time, money and other resources

Commodities, etc.:

- 3700 Clothing and textiles

RPA 706. CONTROL OF INSECT PESTS OF MAN AND HIS BELONGINGS

Insects, ticks and mites are known to be vectors of such diseases as encephalitis, malaria, typhus, bubonic plague, and Rocky Mountain Spotted Fever. Mosquitoes, flies and other insects are also a great annoyance to man. Insects cause serious damage to belongings of man. Included are such pests as clothes moths, roaches and carpet beetles. We need to learn more about the biology of the insects affecting man, and about safe, effective, and economical means of controlling them.

Areas of research include:

- (a) Studies on the biology and ecology of the insects, ticks and mites of concern.
- (b) Developing attractants and repellents.
- (c) Developing biological methods of control.
- (d) Developing safer and more effective methods of chemical control.
- (e) Developing methods to control insects that damage clothing, rugs, and upholstery; and mosquitoes, roaches, gnats, house flies and sand flies.

- Exclude:
- (1) Studies on the role of insects, ticks and mites in disease transmission. (Use RPA 707).
 - (2) Research on control of insects affecting stored food products. (Use RPA 404, 408 or 412).
 - (3) Research on control of insects affecting pets.
(Use RPA 210).
 - (4) Research on control of insects affecting wood products.
(Use RPA 401).

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4900 Biology of plants and animals

Commodities, etc.:

- 3700 Clothing and textiles
- 3900 Structures and facilities (see subcodes)
- 4000 People as individual workers, consumers, and members of society
- 6500 Invertebrates (including insects, mites, ticks, snails, slugs, and leeches)

RPA 707. PREVENT TRANSMISSION OF ANIMAL DISEASES AND PARASITES TO MAN

Residents of the United States are fortunate that animal diseases transmissible to man have become a relatively low risk. Although much progress has been made in eradicating brucellosis and tuberculosis in cattle, there are many other animal diseases and parasites that represent a potential threat to human health. Among these are anthrax, encephalitis, leptospirosis, rabies, erysipelas, and trichinosis. The latter is probably the most serious, because this parasite is difficult to detect in pork and its presence in this country is a barrier to export sales.

Areas of research include:

- (a) Understanding the mechanisms involved in transmission of animal diseases to man, including the role of insects, ticks and mites.
- (b) Developing control programs to prevent transmission of animal diseases to man.
- (c) Developing means of preventing the transmission of trichinosis to man.
- (d) Developing improved procedures, equipment, and facilities for use in red meat and poultry inspection programs.

Exclude: (1) Research on animal disease where the concern is the protection of the animal itself. (Use RPA 211).

Classification Guidelines:

Activities:

- 4600 Protection against diseases, parasites and nematodes and their control agents
- 4900 Biology of plants and animals

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members

RPA 708. HUMAN NUTRITION

Human nutrition research provides fundamental knowledge about the relationship of food eaten by people to their physical and mental status and development and the levels of well-being maintained during the life span. Some research has been conducted on human requirements for nutrients. So many gaps exist, however, that far more research is needed to provide answers to what the human nutrient requirements are and how best to meet those requirements from the food available. Research to support the programs in consumer education and food use is vital to the development of the country.

Areas of research include:

- (a) Guidelines for selection of food combinations to meet nutritional requirements.
- (b) Methods of evaluating nutritional status.
- (c) Determination of the nutrient content of foods.
- (d) Methods to quantify the relationship of nutrient intake to well-being.
- (e) The relationship of nutrient intake to health, intellectual development, vigor, and longevity.
- (f) Requirements for energy, carbohydrate, fat, protein, amino acids, fatty acids, minerals, and vitamins as related to age, sex, activity, and physiological and environmental conditions.
- (g) The interrelationships among nutrients as they affect absorption, metabolism, growth, and maintenance requirements.
- (h) Evaluation of the effectiveness of nutritional phases of programs to improve nutritional status.

Classification Guidelines:

Activities:

- 6300 Nutritional values, consumption patterns, and eating quality of foods
- 7300 Evaluation of public programs, policies, and services

Commodities, etc.:

- 0800-1200, 1400-2000, 2200-2500, 2700-3400, 3800, 4000, 4100
(See Commodity Classification - Table "B")

RPA 709. REDUCTION OF HAZARDS TO HEALTH AND SAFETY

Public Health Service findings indicate that cigarette smoking has a deleterious effect on health. Tobacco growers, manufacturers, distributors, suppliers, exporters, and the consuming public all have a substantial stake in the development of improved cigarettes by reducing or modifying the substances in cigarette smoke which create hazards to good health.

Handling of some agricultural products can cause allergies or other toxic reactions. Some farm supplies may be toxic if inhaled, if accidentally brought in contact with the skin, ingested or otherwise improperly used. Certain concentrations of dusts or fumes from agricultural products or supplies are explosive. Farm and processing equipment must be used correctly and effectively shielded to prevent accidents. Safety is an essential ingredient of sound agriculture.

Areas of research include:

- (a) Improvement of analytical methods for determining the constituents of tobacco and tobacco smoke.
- (b) Isolation and identification of the components of tobacco and tobacco smoke that may be injurious to human health.
- (c) Developing methods to eliminate or deactivate injurious components of tobacco smoke.
- (d) Developing methods to detect and to avoid the harmful effects of toxic residues and harmful mycotoxins in tobacco.
- (e) Developing methods for the safe handling of farm products, supplies, and livestock.
- (f) Determining the need for protective devices and procedures for safe usage of farm machinery and equipment.
- (g) Determining the nature, frequency, and causes of farm accidents.
- (h) Developing methods to reduce fire risks and to improve fire control measures for cotton gins, barns, and other farm structures.
- (i) Determining risks and developing needed safety measures for product handling in processing plants and marketing channels.

Exclude: (1) Research on toxic residues on food products. (Use RPA 701).
 (2) Research on harmful microorganisms and naturally occurring toxins in food. (Use RPA 702).
 (3) Research on disease transmission. (Use RPA 707).

Classification Guidelines:

Activities:

- 4810 Protection against fire
- 4830 Protection against pollutants
- 4840 Protection against climatic extremes
- 4880 Protection against allergens, toxins, and poisonous plants
- 4890 Protection against other hazards

RPA 709. (Continued)

Commodities, etc.:

- 2100 Cotton (including cottonseed for planting purposes)
- 2600 Tobacco (see subcodes)
- 2800 Miscellaneous and new crops
- 3600 General purpose supplies (includes: Machinery, equipment,
feedstuffs, fertilizers, and pesticides)
- 3900 Structures and facilities (see subcodes)
- 4000 People as individual workers, consumers and members of society

GOAL VIIIASSIST THE MORE THAN 50 MILLION RURAL AMERICANS TO IMPROVE
THEIR LEVEL OF LIVING

Median farm family income in 1960 was only half that of urban families. Rural non-farm family income was about three-fourths that of urban families. Ways must be found to assist rural people in adjusting to structural changes in agriculture and to balance farm output and market demand. This income disparity also can be reduced by improving the economic potential of rural youth and adults. Also needed is information on how to use money and other resources to achieve desired goals without losing the uniquely desirable aspects of rural life. As rural living becomes more attractive, the migration pressures upon our cities will be reduced.

RPA's 801-808, inclusive: Pages 147-155, inclusive

RPA 801. HOUSING

Housing, as individual units and collectively, has a significant impact on the quality of living. Tremendous opportunities exist for research to reveal effective, economical procedures and materials for renovating and modernizing existing houses as well as in design and development of new housing.

Areas of research include:

- (a) Determine family housing requirements on the basis of selected characteristics such as age, income, size; stage in the family cycle; health, occupation, and ethnic background.
- (b) Determine the community, regional, and national needs for housing on the basis of the needs of various kinds of families and the current status of housing. Special consideration should be directed to migrants, the aged, low income groups and the physically handicapped.
- (c) Determine the effect of the housing environment on the development of people.
- (d) Determine costs and benefits of construction systems and materials giving special attention to consumer needs and overcoming market obstacles.
- (e) Study credit availability and financing arrangements and develop improved credit systems which will provide adequate financing for the renovation of houses and construction of new homes.
- (f) Select and develop improved designs, materials and construction methods for both renovation and new construction. Include possibilities for inputs by the homeowner and employees with limited skills and/or training.
- (g) Review and develop building codes and other legal requirements which provide appropriate safeguards to the individual and the community without imposing unnecessary obstacles to efficient, economical construction.
- (h) Consider maintenance needs and develop convenient, economical ways to meet these needs. This should include consideration of the possibilities of inputs by the homeowner.
- (i) Determine and correct the factors contributing to deterioration of housing structures.

Exclude: (1) Development and consideration of the impact of alternative public policies to create incentives for rural living.
(Use RPA 907 or 908)
(2) Research on housing for animals. (Use RPA 317)

Classification Guidelines:

Activities:

- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4810 Protection against fire

RPA 801. (Continued)

Activities (Continued)

- 4820 Protection against flood
- 4830 Protection against pollutants
- 4840 Protection against climatic extremes (frost, hail, wind, drought, etc.)
- 4850 Protection against birds
- 4860 Protection against rodents and other mammals
- 4870 Protection against molds, fungi, and other spoilage organisms
- 4890 Protection against radiation, noise, and other hazards
- 6100 Developing domestic markets, including consumer preference and behavior
- 6400 Quality of family living, including housing, management and use of time, money and other resources
- 6500 Description, inventory and trends
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

- 0600 Trees, forests, and forest products
- 3900 Structures and facilities (see subcodes)
- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members

RPA 802. INDIVIDUAL AND FAMILY DECISION MAKING AND RESOURCE USE AND FAMILY FUNCTIONING

Families and individuals are concerned with social and economic decision making. Social decisions encompass some of the major turning points in family development...the life plans of children and the fulfillment of aspirations. Social decisions involve making the most of human resources such as intelligence, special talents and skills, and special motivations.

Economic decisions are concerned with financial, material and community resources. These may be wages and salaries, goods in kind, public services, or earnings from farm or other businesses. Allocations must be made to provide for current living, investment or capital accumulation.

Quality of family life is highly dependent upon both economic and social decisions; upon task performance and family role behavior, including consumer, parental and wage-earning roles; and upon the interaction of family members both within the family and with others. Knowledge gained from research will provide a basis for assisting families to improve the quality of living.

Areas of research include:

- (a) Factors involved in the decision making process and decisions as affected by availability of resources, stage in the life cycle, living patterns, values, goals, interests and attitudes.
- (b) Consumer behavior and effect of consumer decision making on the quality of life of individuals and families.
- (c) Allocation of resources by individuals and families and resulting consumption patterns and level of living.
- (d) Guidelines for "minimum decency" levels of living, including "market basket" cost of goods and services for various residence situations.
- (e) Family task requirements and ways to improve performance.
- (f) Identification of structural, functional and environmental factors contributing to family life patterns and performance.
- (g) Family roles as influenced by subcultural, economic, social and attitudinal factors, and effect on family cohesiveness and human organization.
- (h) Factors influencing interaction of family members and communication between family members and others.

Classification Guidelines:

Activities:

- 6400 Quality of family living, including housing, management and use of time, money and other resources
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society

RPA 803. CAUSES OF POVERTY AMONG RURAL PEOPLE

Research is needed to discover the underlying social, educational, psychological, nutritional, physical, and economic factors that explain why a significant proportion of people in rural areas are in poverty. Nearly half the people with poverty-level incomes in the United States are in rural areas. Little is known of how the poverty cycle can be broken or how those isolated in poverty can be aided in their own development and in finding and taking advantage of social and economic opportunities.

Areas of research include:

- (a) The characteristics of the rural poor: their physical, educational, economic, and personal resources; their attitudes and interests through which they can be stimulated to improve their situation; their resources, income, and levels of living; and their ability and willingness to migrate to areas with greater economic potential.
- (b) Conditions that give rise to and perpetuate poverty, such as poor health and malnutrition, occupational displacement, mental and physical handicaps, limiting family and community circumstances, inadequate educational preparation, and personal and family catastrophe.
- (c) The factors related to, and the processes by which, some individuals and families have overcome their poverty backgrounds and achieved socio-economic well-being.

Exclude: (1) Research on improvement of economic potential of rural people. (Use RPA 804)
 (2) Research on improving income opportunities in rural communities. (Use RPA 907)

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members
- 4300 Communities, areas and regions, including counties and States and their institutions and organizations

RPA 804. IMPROVEMENT OF ECONOMIC POTENTIAL OF RURAL PEOPLE

Research is needed to provide knowledge which will help people improve their economic potential, enable them to identify and develop their employable skills, and find satisfying employment in the occupation that uses those skills most effectively. In the next few years most rural youth seeking first employment will need to find jobs in non-farm occupations.

Areas of research include:

- (a) Developing information on the requirements for success in various occupational alternatives, including education, experience, and financial resources.
- (b) Developing programs to provide education, training, and retraining needed by rural youth and adults to take advantage of farm and non-farm employment opportunities.
- (c) Determining ways to raise the level of aspirations of rural youth and to motivate them to acquire necessary training and education.
- (d) Determining opportunities for operators of low-income farms to improve their situation through adjustments to improve farm income, combining farming with part-time non-farm work, or working full time at a non-farm job or business.

Exclude: (1) Research to improve income opportunities in rural communities. (Use RPA 907).

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members

RPA 805. COMMUNICATION AND EDUCATION PROCESSES

Effective communication is vital to the educational process, the dissemination of knowledge, development of sound public policy, successful conduct of public programs, and development of understanding among groups in our society.

Research on communication will assist in obtaining agreement on the most important problems; gaining public support for research on the problems; and reducing the time lag between discovery and development and the adoption of improved practices and products.

Research on education processes is needed to determine effective ways to achieve educational goals.

Areas of research include:

- (a) Determining the various forms and combinations of mass media, group and person-to-person contacts most effective for various types of persons and groups of persons and for different kinds of information to be communicated.
- (b) Developing techniques, procedures, and educational processes for effectively communicating information to people with varying backgrounds and skills.
- (c) Developing effective ways of reaching individuals and families and motivating them to utilize available information, resources and technology that may affect their economic, social, and physical well-being.

Classification Guidelines:

Activities:

6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

4000 People as individual workers, consumers and members of society

4100 The family and its members

4300 Communities, areas and regions, including counties and States and their institutions and organizations

RPA 806. INDIVIDUAL AND FAMILY ADJUSTMENT TO CHANGE

The quickening pace of technological, economic and social change increases the difficulties of many families in making successful adjustments. What was predominantly a rural economy has been transformed to a transitional society having many urban characteristics. These changes and those involved in farm-non-farm or rural-urban migration often require major social, psychological, and economic adjustments by individuals and families, some of which are very stressful and disorganizing. People who fail to make successful adjustments, often those who are poorly educated and with limited employable skills, present critical problems.

Areas of research include:

- (a) Basic occupational skills and personal competencies needed by rural people to continue to be productive and lead satisfying lives in a changing environment.
- (b) Ways in which individuals and families can be motivated and helped to meet changes in economic and social conditions, especially those involved in a transition from a farm to a non-farm or rural to urban environment.
- (c) Useful alternatives in dealing with problems of occupational displacement and economic, educational, psychological, mental and physical handicaps.
- (d) Understanding the role of the family and developing ways to help families cope with the demands of modern society.
- (e) Composition and trends in farm and rural population.
- (f) Migration patterns of the farm and rural population.
- (g) Identifying factors within the family and the general environment that influence the development of individuals including social, mental, physical, and emotional growth and well-being.

Exclude: (1) Research on the causes and alleviation of poverty.
(Use RPA 803, 804 and 907)

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members
- 4300 Communities, areas and regions, including counties and States and their institutions and organizations

RPA 807. STRUCTURAL CHANGES IN AGRICULTURE

Research provides an understanding of the significance of changes taking place in the organization and structure of the agricultural industry. Among these changes are the trend toward fewer and larger farms; the greater specialization of production; the use of vertical coordination arrangements, and accompanying shifts of functions from farm to non-farm firms; the status of the farm labor force; and changes in the managerial status of the farm operator.

The study of structural changes in agriculture provides information that is essential for accurate projections of: (1) supply responses to changes in price-cost conditions; (2) demand for production inputs; and (3) farmer participation in various types of organization. In addition, an understanding of changes in the structure of agriculture is basic to sound agricultural program development, both in appraising the probable degree of participation in the program, and its impact on output and farm incomes.

Areas of research include:

- (a) Assembling and analyzing data on current and prospective trends in numbers of farms, by size, type, tenure and managerial status, and region. Estimating, for homogeneous groups of farms, averages such as the following: total investment, labor force, inputs, costs, production, gross income and net income.
- (b) The extent and forms of vertical coordination and other arrangements between farm and non-farm firms and the associated transfer of functions from farm to supply, processing, or marketing firms.
- (c) Interrelationships between changes in the structure of agriculture and the status and composition of its labor force, including the effects of increasing wage levels and wage and hour legislation on capital-labor substitution in agriculture.
- (d) Changes in the financial structure of agriculture; management and ownership of and equity in farm resources.
- (e) Developing alternative proposals and procedures which will encourage desirable structural changes in agriculture.

Classification Guidelines:

Activities:

- 5300 Management of labor, capital and other inputs
- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 7200 Information documentation and retrieval

Commodities, etc.:

- 2100, 3000-3300 (See Commodity Classification - Table "B")
- 4200 The farm as a business enterprise
- 4400 Agricultural economy of United States and sectors thereof, including interrelationships with the total economy
- 4600 Farmer Cooperatives
- 4700 Marketing, processing and supply firms other than cooperatives
- 4800 Marketing systems and sectors thereof

RPA 808. GOVERNMENT PROGRAMS TO BALANCE FARM OUTPUT AND MARKET DEMAND

The demand for most farm products is highly inelastic. Hence, in a free market, small percentage changes in supply may cause much greater percentage changes in price. Because of the nature of crop and livestock production these fluctuations, in supply cannot readily be avoided. The resulting price fluctuations in turn, introduce additional instability into the market. Among the premises of price-support and production-control programs are these: (1) in a free market, it is difficult to balance farm output with market demand at stable prices, and (2) that the interests of both producers and consumers are better served by orderly markets than by unstable ones.

Areas of research include:

- (a) Developing effective ways to stabilize farm prices and incomes through government purchases of farm products, and storage of surplus stocks against periods of short supply.
- (b) Developing effective and acceptable supply restraints and production incentives for use as needed.
- (c) Developing an economic model to predict the response of farmers to various economic influences, including U. S. Department of Agriculture programs for balancing supply and supporting prices, cropland adjustments, and incentive payments. This type of analysis assists policy makers in selecting program alternatives with greater certainty of attaining farm program goals at minimum costs.
- (d) Determining the effectiveness of alternative arrangements for administering government programs.

Classification Guidelines:

Activities:

7300 Evaluation of public programs, policies and services

Commodities, etc.:

0600 - 1200, 1400 - 3400, (See Commodity Classification -
Table "B")

4200 The farm as a business enterprise

4400 Agricultural economy of United States and sectors thereof,
including interrelationships with the total economy

6700 Plants

6800 Animals (Vertebrates)

GOAL IX

PROMOTE COMMUNITY IMPROVEMENT INCLUDING DEVELOPMENT OF BEAUTY,
RECREATION, ENVIRONMENT, ECONOMIC OPPORTUNITY, AND PUBLIC
SERVICES

Achievement of many aspirations depends upon group action at local, state, and Federal levels to make desired services available. To a considerable measure, availability to individuals of utilities, health services, opportunities for education, employment, and recreation depend upon community action. Community groups, private and public, need facts as a basis for programs that lead to group satisfaction from joint use of economic and natural resources.

RPA's 901-908, inclusive: Pages 157-167, inclusive.

RPA 901. ALLEVIATION OF SOIL, WATER, AND AIR POLLUTION AND DISPOSAL OF WASTES

Soil, water, and air are being polluted with a variety of substances, both inorganic and organic. Some of the contaminants in addition to those of industrial origin are organic pesticides, radionuclides in fertilizers, growth regulating chemicals, animal and crop wastes, mulching materials, pathogenic microorganisms, heavy metals, salts used on roads for de-icing, lead from fuel combustion, allergens, and radioactive fallout. Agricultural research must be primarily concerned with alleviating pollution initiated by agricultural and forestry practices.

Areas of research include:

- (a) The character, intensity, and causes of pollution from agricultural and forest practices and the frequency of their occurrence.
- (b) The behavior and fate of pesticides and a wide variety of other pollutants in air, soil and water.
- (c) Methodology and instrumentation for detection of pollutants and methods of analysis.
- (d) Public policy that would reduce pollution.
- (e) Alternative methods of reducing and controlling pollution to levels that are not harmful to man, plants, or animals; or methods that will prevent emission of the pollutant.
- (f) The role and use of living organisms in removing pollutants from the environment.
- (g) Minimum environmental quality standards for human, animal, and plant health.
- (h) Methods of collecting, storing, moving and disposing of animal, plant, and radioactive wastes including those from processing plants.
- (i) Alleviating odors, dust, and noise.
- (j) Developing useful products from wastes to help offset the costs of disposal.
- (k) Safe methods of disposing of pesticides and other agricultural chemicals and containers of such materials.
- (l) Aquatic weeds as a pollutant.

Exclude: (1) Research on the protection of plants, animals, and man from harmful effects of pollution. (Use RPA 214)

Classification Guidelines

Activities:

- 4830 Protection against pollutants
- 4880 Protection against allergens, and toxins
- 4890 Protection against radiation, noise and other hazards
- 5900 Improving economic and physical efficiency in marketing including analysis of market structure and functions
- 7300 Evaluation of public programs, policies and services

RPA 901. (Continued)

Commodities, etc.:

0100 Soil and land
 0200 Water
 0300 Watersheds and river basins (See subcodes)
 0400 Air and climate
 0600 Trees, forests, and forest products (excluding edible tree nut
 crops (see 1050, and tung (see 2560)
 0800-3400, 3600, 3900 (See Commodity Classification - Table "B")
 6700 Plants
 6800 Animals (Vertebrates)

The general intent of this RPA is to alleviate soil, water, and air pollution. The resource being protected is thus 0100-0400 (see above) one or more of which should be listed as the commodity or resource on Form AD-417. If, however, the research is primarily a matter of developing a way to dispose of a particular kind of waste, the appropriate crop or animal commodity, 0600, 0800 - 3400, and 3900. (See Commodity Classification - Table B), should be listed on Form AD-417.

RPA 902. OUTDOOR RECREATION

Outdoor recreational research provides information to guide the management of rural lands for recreation, and to help coordinate this use with other land resource uses. The research involves problems in management of the resource and socio-economic relationships of users to the resource. Demands for recreation continue to increase, and are becoming more varied and more complex, at a time when pressure on all land resources is increasing.

Areas of research include:

- (a) Determining the demand for outdoor recreation.
- (b) Criteria for selecting sites which will attract and support heavy recreation use.
- (c) Developing practical methods to maintain existing recreation sites and restoring those depleted by heavy use.
- (d) Requirements for aesthetic landscapes and means for producing and maintaining them.
- (e) Methods for the protection, management, and recreational use of wilderness-type historical and archeological areas and scenic landscapes.
- (f) Management systems and special equipment, and facilities which will minimize dangers from fire, avalanches and other natural hazards.
- (g) Understanding of visitor preferences and attitudes regarding outdoor recreation opportunities.

Classification Guidelines:

Activities:

- 4100 Resource description and inventory
- 4300 Resource development, conservation and management
- 4500 Protection against insects, mites, snails and slugs and their control agents
- 4700 Protection against weeds and their control agents
- 6500 Description, inventory and trends
- 6700 Improvement of social well-being, etc.

Commodities, etc.:

- 0500 Recreational Resources (See subcodes)

RPA 903. MULTIPLE USE POTENTIAL OF FOREST LAND AND EVALUATION OF FORESTRY PROGRAMS

Most forest areas and related resources can be devoted to widely varying uses depending on the owner's objective and the allocation of investments for resource development. On more than 300 million acres of National Forests and other public lands, for example, guidelines are needed to determine the best combination of uses or systems of managing forest land for timber, water, forage, recreation, wildlife or other purposes.

Forestry programs to increase production of timber and related forest resources need to be evaluated to determine their relative costs and effectiveness. These programs cover a wide range of activities including protection against fire, insects and disease; reforestation; timber stand improvement; and improved timber harvesting.

Areas of research include:

- (a) Determining the relative efficiency of various combinations of measures and programs to meet projected demands for timber and other forest-based products and services.
- (b) Adapting basic data on output potentials and operational guidelines provided by timber range, recreational, and wildlife research for use in analyzing multiple use management plans and programs.
- (c) Evaluating the response of forest owners and operators to various types of public and private forestry assistance programs.
- (d) Developing procedures and criteria for evaluating the relative costs and benefits of alternative forest land uses and combinations.

Exclude: (1) Research on the economics of timber production per se.
(Use RPA 303)

Classification Guidelines:

Activities:

- 4300 Resource development, conservation and management
- 4400 Evaluation of alternative uses and methods of use
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 0300 Watersheds and river basins
- 0500 Recreational resources (See subcodes)
- 0600 Trees, forests, and forest products (See subcodes)
- 0700 Range
- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats

RPA 904. FISH AND OTHER MARINE LIFE, FUR-BEARING ANIMALS AND OTHER WILDLIFE

Research on wildlife, fur-bearing animals, fish and other marine life is needed to meet the ever growing demands of hunters, trappers, and fishermen; to develop improved production of farm reared fish and fur-bearing animals; to assure continuing supplies of marine life for food and other purposes, and to meet increasing demands for aesthetic values such as non-game wildlife.

To maintain and increase the supply of wildlife, fish, and other marine life it is essential to know how to maintain and enhance their habitat, and to determine the biological requirements and relationships of each species, including cover and food for normal growth.

Increased knowledge of fish biology and production requirements and techniques is needed to service the needs of the increasingly important fish farming industry. This includes fish, crayfish and other marine life in either fresh or salt water.

Areas of research include:

- (a) The life histories and population dynamics of fish, fur-bearing animals, and wildlife, including non-game and vanishing species and marine organisms and of plants that provide food and shelter.
- (b) The ecological and physiological requirements of fish, fur-bearing animals, wildlife, and other marine life.
- (c) Adaptation of plants to sites and selection and genetic improvement of both native and exotic food and cover plants.
- (d) Improving wildlife habitat through such measures as seeding, planting, prescribed burning, spraying, fertilizing and manipulation of native vegetation.
- (e) Improving fish habitat and food supplies through management of streamside vegetation, channel stabilization and creation of spawning beds.
- (f) Breeding, selection, feeding, and management of wildlife and fur-bearing animals.
- (g) Breeding, selection, management and feeding of fish and other marine animals for commercial production (fish farming).
- (h) The biology and environmental requirements of marine life and possibilities of environmental control.
- (i) Protection against insects, diseases and other hazards, except pollutants.
- (j) Marketing studies related to any of the above commodities.

- Exclude:
- (1) Research on protection of marine organisms, fish and wildlife against pollutants. (Use RPA 214)
 - (2) Research on new and improved animal products. (Use RPA 410 or 411)
 - (3) Research on quality maintenance in marketing animal products. (Use RPA 412)
 - (4) Grades and standards. (Use RPA 501)
 - (5) Supply, demand and price analysis (use RPA 506)

RPA 904. (Continued)

Classification Guidelines:

Activities:

4100-5600, 5800-6300, 7300 (See Activity Classifications - Table "A")

Commodities, etc.:

- 0800 Fish, shellfish, game and fur-bearing animals and other wildlife and their habitats (See subcodes)
- 3600 General purpose supplies. Includes: machinery, equipment, fertilizers, feedstuffs and pesticides
- 3900 Structures and facilities (See subcodes)

RPA 905. TREES TO ENHANCE RURAL AND URBAN ENVIRONMENT

This research provides some of the scientific knowledge required to maintain or improve the quality of the rural and urban environment, and to enhance natural beauty through special-purpose tree planting. Technological change is multiplying the need for special tree planting to screen junkyards and highways, suppress noise, slow the movement of dust and debris, and to provide trees for shade, beauty and shelterbelts to protect crops, animals and farmsteads. Research is needed to find species and techniques so that trees can survive smoke and air pollution, compacted soils, deficient or excessive moisture, and other adverse conditions. The end product of concern in this research is a standing tree to enhance the environment.

Areas of research include:

- (a) Selection and breeding of trees for urban environments, for shelterbelts, shade and other special purposes.
- (b) Protection from insects, diseases and other hazards through cultural, biological or chemical means.
- (c) Methods of site preparation and planting appropriate for special-purpose tree planting.
- (d) Culture and maintenance of urban trees and stands.
- (e) Culture and improvement of shelterbelts.
- (f) Marketing or nursery stock of trees used to enhance the environment.
- (g) Soil and site requirements of species needed to improve the environment.

Classification Guidelines:

Activities:

4300, 4500 - 5300, 5800-6200 (See activity classifications - Table "A")

Commodities, etc.:

0600 Trees, forests, and forest products (See subcodes)
1300 Ornamentals and turf

RPA 906. CULTURE AND PROTECTION OF ORNAMENTALS AND TURF

More efficient production and new varieties of flowers, ornamental plants and turf are needed today for city and suburban gardeners and for the national beautification effort. Ornamental plants resistant to insects, drought, flood, diseases, traffic, and the competition of weeds are needed for highway and railway rights-of-way and other areas where intensive care is not possible.

The floricultural and nursery industries, and owners and managers of parks and golf courses have many unsolved problems. Costs of protecting ornamentals against insects, diseases and weeds are high, and losses due to decreased production are substantial. Problems of maintaining quality during transporting, storing and marketing ornamentals are important. All research on ornamentals and turf is included under this single RPA. Christmas trees (0611) shade trees (0615, 0624, and 0625), and shelterbelts and windbreaks (0631) are not classified as ornamentals.

Areas of research include:

- (a) Breeding and selection to enhance aesthetic and special use characteristics.
- (b) Breeding and selection for hardiness and resistance to drought, insects, diseases, and other hazards.
- (c) Methods for protection from insects, diseases, weeds, and other pests.
- (d) Improved methods of propagation, culture and care.
- (e) Improved marketing and handling, transportation and packaging.
- (f) Optimum methods and materials for fertilizing and watering ornamentals and turf.

Exclude: (1) Research on Christmas trees, ornamental and shade trees and shelterbelts and windbreaks. (Use RPA's 110, 111, 201, 202, 214, 301-303, 401, 502, 511-513).

Classification Guidelines:

Activities:

4500 - 5300, 5600 - 6200, 6400 (See activity classifications - Table "A")

Commodities, etc.:

1300 Ornamentals and turf (See subcodes)

RPA 907. IMPROVED INCOME OPPORTUNITIES IN RURAL COMMUNITIES

Research on income improvement in rural communities will identify ways by which depressed areas can attain full economic potential. Only by providing adequate income opportunities can these communities retain more of their young people and finance the kind of public and private facilities and services that make them attractive places to live. Accelerated economic development of depressed rural areas is of vital concern to many large urban centers, which are not equipped to assimilate the flood of rural migrants they receive.

Areas of research include:

- (a) Criteria for delineating functional socio-economic areas for planning in order to achieve effective economic development in an area.
- (b) Developing a set of economic indicators for rural areas.
- (c) The process of economic growth and the influences that shape it, including the resource base of the area and its locational advantages and disadvantages.
- (d) Analysis of the comparative economic advantage for agriculture and industry and the prospects of increasing local employment opportunities and providing a more adequate tax base for the support of community services.
- (e) Potential for further development of agricultural and forest resources in rural areas, including the associated supply, processing and marketing facilities.
- (f) Farm and community income possibilities from the development of new and expanded enterprises including raising pets, horses, and laboratory animals, and development of fee hunting and fishing and other recreation areas.
- (g) Potential contribution of improved transportation facilities in bringing desirable employment opportunities within commuting reach of residents of rural communities.
- (h) The kinds of public programs needed to stimulate rural community development and the effectiveness of existing programs in accomplishing this objective.
- (i) Factors associated with the occurrence of depressed areas, and policy measures that might have prevented such areas from falling behind the rest of the economy.

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes
- 7000 Design of experiments and methods of statistical analysis
- 7200 Information documentation and retrieval
- 7300 Evaluation of public programs, policies and services

RPA 907. (Continued)

Commodities, etc.:

- 4000 People as individual workers, consumers and members of society
- 4100 The family and its members
- 4300 Communities, areas, and regions including counties and States and their institutions and organizations.

RPA 903. IMPROVEMENT OF RURAL COMMUNITY INSTITUTIONS AND SERVICES

Rural communities need information to help develop the organization, agencies, services, and leadership which will make them attractive places to live, work and establish businesses.

Some rural communities are experiencing sharp increases or decreases in population. Modern transportation and communication have contributed to the development of trading and social centers serving large geographic areas, and have caused the decline or elimination of a great many small centers. Uncoordinated development and other changes in land use often make it impossible to provide public services economically.

Areas of research include:

- (a) Criteria for delineating functional socio-economic areas in order to provide effective and efficient community institutions and services.
- (b) Measuring the adequacy, quality, and cost of education, health, sanitation, and water systems, and other public and private services.
- (c) The organizational and operational efficiency of local government units in meeting the needs of modern rural society.
- (d) Effective protection of the community's interest in changes in land use through zoning and other means, including suburban development and industrial and agricultural uses.
- (e) Effective development, coordination, and adaptation of the various services, agencies, and organizations to best meet the community's needs.

Classification Guidelines:

Activities:

- 6500 Description, inventory and trends
- 6600 Economic development and adjustment
- 6700 Improvement of social well-being, including social services and facilities and adjustment to social and economic changes
- 7300 Evaluation of public programs, policies and services

Commodities, etc.:

- 4300 Communities, areas, and regions, including counties and States and their institutions and organizations

GENERAL GUIDELINES TO RESEARCH CLASSIFICATION (FORM AD 417)

Fields 41-52: Classification by Activity, Commodity, Science, and Problem Area Codes

Fields 41-52: Each Research Work Unit is to be classified in four different ways, as follows: (1) Activity, (2) Commodity or Resource, (3) Field of Science, and (4) Research Problem Area (RPA). The percentage of the total research effort which is assignable to each category in the four classification schemes must be estimated.

In classifying projects it is important to recognize the mathematical relationship that exists between the total percentages shown under Activity, Commodity, and Field of Science. The sum of the unduplicated percentages assigned in the activity column should equal 100%. The sum of the unduplicated percentages shown in the commodity column should equal 100 times the number of separate activities shown in the activity column. Similarly, the sum of the percentages shown in the Field of Science column should add to a multiple of 100.

Stated in a different way, for each Activity Classification the Commodity percentages should total 100%, and for each Activity-Commodity Classification the Field of Science should total 100%.

Examples of entries in fields 41-52, inclusive, are given on the following pages. The process is illustrated in two steps for clarification. The minimum percent acceptable for a product of 2 x 4 x 6 for fields 41 through 52 is ten percent.

Fields 62 - 67 Special Commodity Sub-Codes

Where the Classification Manual shows sub-commodities under a primary commodity, one or more sub-commodity codes must be entered in fields 62 to 67. The total of the percentages for sub-commodities should equal the percent for the related commodity product in column 9 of fields 41-52, inclusive. See page 171 for an example.

U. S. DEPARTMENT OF AGRICULTURE
RESEARCH WORK UNIT/PROJECT DESCRIPTION - CLASSIFICATION OF RESEARCH

U. S. DEPT. OF AGRICULTURE, STATE AGRICULTURAL EXPERIMENT STATIONS
AND OTHER INSTITUTIONS

DATE (Day, Month, Year)

1 ACCESSION NO.	2 AGENCY IDENTIFICATION NO.	3	4	5 WORK UNIT/PROJECT NO.	31 HATCH MARKETING
					YES <input type="checkbox"/> A NO <input type="checkbox"/> B
32 BASIC RESEARCH			33 APPLIED RESEARCH		34 DEVELOPMENT EFFORT
%			%		%

CLASSIFICATION BY ACTIVITY, COMMODITY, SCIENCE, PROBLEM AREA AND PPBS CODES

ACTIVITY		COMMODITY		SCIENCE		PROBLEM AREA	PPBS	PRODUCT OF (2) X (4) X (6)
(1) CODE	(2) %	(3) CODE	(4) %	(5) CODE	(6) %	(7) CODE	(8) CODE	(9) %
41 4900	50	1400	50	0212	40			10
42				0412	60			15
43		1500	50	0212	100			25
44 5000	50	1400	60	0212	40			12
45				0412	60			18
46		1500	40	0212	50			10
47				0412	50			10
48								
49								
50								
51								
52								

SPECIAL CLASSIFICATION

SPECIAL CATEGORY	%	SPECIAL COMMODITY	%	PESTICIDE CODE	%	WATER RESOURCES CODE	%
55 Pollution related		62		68 Target I		73	
56 Health and medical related		63		69 Target II		74	
57 Tobacco-health related		64		70 Target III		75	
58 Weather related		65		71 Target IV		76	
59 Nuclear radiation related		66		72 Target V			
60 Poverty area related		67					
61 Natural beauty related							

79 COOPERATORS	COOPERATING DEPARTMENTS WITHIN STATE PERFORMING INSTITUTION (List)
USDA <input type="checkbox"/> A OTHER FEDERAL AGENCIES <input type="checkbox"/> B INDUSTRY AND OTHER <input type="checkbox"/> C STATE <input type="checkbox"/> D	80
83 REPORTING DEPARTMENT WITHIN STATE PERFORMING INSTITUTION	81
	82

U. S. DEPARTMENT OF AGRICULTURE RESEARCH WORK UNIT/PROJECT DESCRIPTION - CLASSIFICATION OF RESEARCH U. S. DEPT. OF AGRICULTURE, STATE AGRICULTURAL EXPERIMENT STATIONS AND OTHER INSTITUTIONS							DATE (Day, Month, Year)	
1 ACCESSION NO.		2 AGENCY IDENTIFICATION NO.		3 WORK UNIT/PROJECT NO.		31 HATCH MARKETING		
						YES <input type="checkbox"/> A NO <input type="checkbox"/> B		
32 BASIC RESEARCH				33 APPLIED RESEARCH		34 DEVELOPMENT EFFORT		
%				%		%		
CLASSIFICATION BY ACTIVITY, COMMODITY, SCIENCE, PROBLEM AREA AND PPBS CODES								
ACTIVITY		COMMODITY		SCIENCE		PROBLEM AREA	PPBS	PRODUCT OF (2) X (4) X (6)
(1) CODE	(2) %	(3) CODE	(4) %	(5) CODE	(6) %	(7) CODE	(8) CODE	(9) %
41 4900	50	1400	50	0212	40	307	6122	10
42 4900	50	1400	50	0412	60	307	6122	15
43 4900	50	1500	50	0212	100	307	6122	25
44 5000	50	1400	60	0212	40	307	6122	12
45 5000	50	1400	60	0412	60	307	6122	18
46 5000	50	1500	40	0212	50	307	6122	10
47 5000	50	1500	40	0412	50	307	6122	10
48								
49	(This is the correct manner in which lines 41-52 should be prepared).							
50								
51								
52								
SPECIAL CLASSIFICATION								
SPECIAL CATEGORY	%	SPECIAL COMMODITY	%	PESTICIDE CODE	%	WATER RESOURCES CODE	%	
55 Pollution related		62		68 Target I		73		
56 Health and medical related		63		69 Target II		74		
57 Tobacco-health related		64		70 Target III		75		
58 Weather related		65		71 Target IV		76		
59 Nuclear radiation related		66		72 Target V				
60 Poverty area related		67						
61 Natural beauty related								
79 COOPERATORS				COOPERATING DEPARTMENTS WITHIN STATE PERFORMING INSTITUTION (List)				
USDA <input type="checkbox"/> A OTHER FEDERAL AGENCIES <input type="checkbox"/> B INDUSTRY AND OTHER <input type="checkbox"/> C STATE <input type="checkbox"/> D				80				
83 REPORTING DEPARTMENT WITHIN STATE PERFORMING INSTITUTION				81				
				82				

U. S. DEPARTMENT OF AGRICULTURE RESEARCH WORK UNIT/PROJECT DESCRIPTION - CLASSIFICATION OF RESEARCH U. S. DEPT. OF AGRICULTURE, STATE AGRICULTURAL EXPERIMENT STATIONS AND OTHER INSTITUTIONS							DATE (Day, Month, Year)		
1 ACCESSION NO.		2 AGENCY IDENTIFICATION NO. 3		4		5 WORK UNIT/PROJECT NO.		31 HATCH MARKETING YES <input type="checkbox"/> A NO <input type="checkbox"/> B	
32 BASIC RESEARCH %				33 APPLIED RESEARCH %				34 DEVELOPMENT EFFORT %	
CLASSIFICATION BY ACTIVITY, COMMODITY, SCIENCE, PROBLEM AREA AND PPBS CODES									
ACTIVITY		COMMODITY		SCIENCE		PROBLEM AREA	PPBS	PRODUCT OF (2) X (4) X (6)	
(1) CODE	(2) %	(3) CODE	(4) %	(5) CODE	(6) %	(7) CODE	(8) CODE	(9) %	
41 6200	50	4500	100	2630	100	601	6360	50	
42 6000	50	2600	20	2630	100	506	6030	10	
43 6000	50	2600	80	2630	100	506	6030	40	
44									
45									
46									
Note: Percent Subcode total for commodity must equal product of 2 x 4 x 6.									
47									
48									
49									
50									
51									
52									
SPECIAL CLASSIFICATION									
SPECIAL CATEGORY	%	SPECIAL COMMODITY	%	PESTICIDE CODE	%	WATER RESOURCES CODE	%		
55 Pollution related		62 2630	10	68 Target I		73			
56 Health and medical related		63 2810	10	69 Target II		74			
57 Tobacco-health related		64 2820	20	70 Target III		75			
58 Weather related		65 2890	10	71 Target IV		76			
59 Nuclear radiation related		66		72 Target V					
60 Poverty area related		67							
61 Natural beauty related									
79 COOPERATORS				COOPERATING DEPARTMENTS WITHIN STATE PERFORMING INSTITUTION (List)					
USDA <input type="checkbox"/> A OTHER FEDERAL AGENCIES <input type="checkbox"/> B INDUSTRY AND OTHER <input type="checkbox"/> C STATE <input type="checkbox"/> D				80					
83 REPORTING DEPARTMENT WITHIN STATE PERFORMING INSTITUTION				81					
				82					

